**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #58 - Non-Dairy Operation Less Than 300 AU with Land Application

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a small non-dairy Animal Feeding Operation (AFO) of less than 300 animal units (AU)--primarily swine, poultry, and beef AFOs. The producer may export (material transferred to another owner with written documentation of the transfer) modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

**Before Situation:**

The owner/operator of a small sized non-dairy AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

**After Situation:**

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans) and to NRCS with the CNMP Case File data that describes management and conservation practice solutions to all identified resource concerns on the small-sized non-dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventories-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities for conservation practices to be installed in units of measure that align with the practice standards. Accurate recordkeeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $8,351.86

**Scenario Cost/Unit:** $8,351.86

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 55 | $5,055.05 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 43 | $3,296.81 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #59 - Dairy Operation Less Than 300 AU with Land Application

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) and CNMP Case File will be developed to address resource concerns on a small Dairy Animal Feeding Operation (AFO) of less than 300 animal units (AU). The producer may export (material transferred to another owner with written documentation of the transfer) modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

**Before Situation:**

The owner/operator of a small sized dairy AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

**After Situation:**

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans) and to NRCS the CNMP with Case File data that describes management and conservation practice solutions to all identified resource concerns on the small-sized dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventories-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities for conservation practices to be installed in units of measure that align with the practice standards. Accurate recordkeeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $10,420.07

**Scenario Cost/Unit:** $10,420.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 75 | $6,893.25 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 46 | $3,526.82 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #60 - Non-Dairy Operation Greater Than or Equal to 300 AU and Less Than 700 AU with Land Application

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a medium non-dairy Animal Feeding Operation (AFO) of greater than or equal to 300 and less than 700 animal units (AU).--primarily swine, poultry, and beef AFOs. The producer may export (material transferred to another owner with written documentation of the transfer) modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

**Before Situation:**

The owner/operator of a medium sized non-dairy AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

**After Situation:**

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans) and to NRCS with the CNMP Case File data that describes management and conservation practice solutions to all identified resource concerns on the non-dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventories-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities for conservation practices to be installed in units of measure that align with the practice standards. Accurate recordkeeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $10,757.70

**Scenario Cost/Unit:** $10,757.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 72 | $6,617.52 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 54 | $4,140.18 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #61 - Dairy Operation Greater Than or Equal to 300 AU and Less Than 700 AU with Land Application

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a medium Dairy Animal Feeding Operation (AFO) of greater than or equal to 300 and less than 700 animal units (AU). The producer may export (material transferred to another owner with written documentation of the transfer) modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

**Before Situation:**

The owner/operator of a medium sized Dairy AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

**After Situation:**

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans) and to NRCS the CNMP with Case File data that describes management and conservation practice solutions to all identified resource concerns on the dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventories-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities for conservation practices to be installed in units of measure that align with the practice standards. Accurate recordkeeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $11,906.81

**Scenario Cost/Unit:** $11,906.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 82 | $7,536.62 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 57 | $4,370.19 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #62 - Non-Dairy Operation Greater Than or Equal to 700 AU with Land Application

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a large non-dairy Animal Feeding Operation ((AFO) of greater than or equal to 700 animal units (AU)--primarily swine, poultry, and beef AFOs. The producer may export (material transferred to another owner with written documentation of the transfer) modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

**Before Situation:**

The owner/operator of a large sized non-dairy AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

**After Situation:**

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans) and to NRCS with the CNMP Case File data that describes management and conservation practice solutions to all identified resource concerns on the non-dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventories-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities for conservation practices to be installed in units of measure that align with the practice standards. Accurate recordkeeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $12,994.96

**Scenario Cost/Unit:** $12,994.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 88 | $8,088.08 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 64 | $4,906.88 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #63 - Dairy Operation Greater Than or Equal to 700 AU with Land Application

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a large Dairy Animal Feeding Operation (AFO) of greater than or equal to 700 animal units (AU). The producer may export (material transferred to another owner with written documentation of the transfer) modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

**Before Situation:**

The owner/operator of a large sized Dairy AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

**After Situation:**

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans) and to NRCS the CNMP with Case File data that describes management and conservation practice solutions to all identified resource concerns on the dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventories-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities for conservation practices to be installed in units of measure that align with the practice standards. Accurate recordkeeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $13,240.21

**Scenario Cost/Unit:** $13,240.21

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 89 | $8,179.99 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 66 | $5,060.22 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #64 - Livestock Operation Less Than 300 AU without Land Application

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a small Animal Feeding Operation (AFO) of less than 300 animal units (AU). The producer exports (material transferred to another owner with written documentation of the transfer) nearly all of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas owned or controlled by the AFO owner/operator. In this scenario, the primary focus will be addressing resource concerns present on the production area, including manure/wastewater handling and storage, and documentation of manure generation by the AFO, and its export. Production area components of the plan must include animal confinement facilities, feeding and lounging areas, animal mortality facilities, and manure containment and storage facilities. Planned practices on the production area must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner’s/operator's production objectives.

**Before Situation:**

The owner/operator of a small AFO has not received a written comprehensive nutrient management plan (CNMP) that addresses all resource concerns present on the facility production areas and any applicable land application areas. Partial implementation of CNMP- related practices for the AFO has potentially occurred. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Resource concerns on the AFO production area remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, erosion and runoff issues from feeding and lounging areas, and recordkeeping documentation of manure generation and exports. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for inspection and monitoring of the existing CNMP-related practices, manure imports/exports may need further improvement.

**After Situation:**

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive conservation plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans) and to NRCS a the CNMP Case File that describes management and conservation practice solutions to all identified resource concerns on the small sized AFO production area and any applicable land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventories/evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; minimize erosion and runoff from feeding and lounging areas, keep accurate AFO animal inventory information, and document AFO manure generation and exports. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Decisions selected in the Record of Decision will provide estimated quantities for conservation practices to be installed in units of measure that align with those in the conservation practice. Accurate recordkeeping documents for operation and maintenance of existing and new CNMP-related practices, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist..

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,522.79

**Scenario Cost/Unit:** $7,522.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 66 | $6,066.06 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 19 | $1,456.73 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #65 - Livestock Operation Greater Than 300 AU without Land Application

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a medium-large Animal Feeding Operation (AFO) of greater than or equal to 300 animal units (AU). The producer exports (material transferred to another owner with written documentation of the transfer) nearly all of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas owned or controlled by the AFO owner/operator. In this scenario, the primary focus will be addressing resource concerns present on the production area, including manure/wastewater handling and storage, and documentation of manure generation by the AFO, and its export. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Planned practices on the production area must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner's/operator's production objectives.

**Before Situation:**

The owner/operator of a medium-large sized AFO has not received a written comprehensive nutrient management plan (CNMP) that addresses all resource concerns present on the facility production areas and any applicable land application areas. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Resource concerns on the AFO production area remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, erosion and runoff issues from feeding and lounging areas, and recordkeeping documentation of manure generation and exports. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for inspection and monitoring of the existing CNMP-related practices, manure imports/exports may need further improvement.

**After Situation:**

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive conservation plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans) and to NRCS a the CNMP Case File that describes management and conservation practice solutions to all identified resource concerns on the small sized AFO production area and any applicable land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventories/evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; minimize erosion and runoff from feeding and lounging areas, keep accurate AFO animal inventory information, and document AFO manure generation and exports. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Decisions selected in the Record of Decision will provide estimated quantities for conservation practices to be installed in units of measure that align with those in the conservation practice. Accurate recordkeeping documents for operation and maintenance of existing and new CNMP-related practices, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $9,345.75

**Scenario Cost/Unit:** $9,345.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 85 | $7,812.35 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 20 | $1,533.40 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #135 - CNMP Less Than or Equal to 300 AU with Land Application (Minimal Engineer Assistance)

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a small non-dairy Animal Feeding Operation (AFO) of less than 300 animal units (AU)--primarily swine, poultry, and beef AFOs. This scenario is for sites or states where the services of a professional engineer are minimal. The producer may export modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan includes all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas result in meeting NRCS planning criteria for water quality, soil erosion, and air quality concerns. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

**Before Situation:**

The owner/operator of an AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. Partial implementation of conservation practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

**After Situation:**

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans) and to NRCS with the CNMP Case File data that describes management and conservation practice systems to address all identified resource concerns on the AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventories-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to address soil erosion, water quality, and air quality within the NRCS planning criteria. Accurate record keeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP.

**Feature Measure:** Each

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,844.10

**Scenario Cost/Unit:** $4,844.10

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 50 | $3,925.00 |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 10 | $919.10 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #136 - CNMP Less Than or Equal to 300 AU without Land Application (Minimal Engineer Assistance)

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on the Animal Feeding Operation (AFO) of less than 300 or equal animal units (AU). This scenario is for sites or states where the services of a professional engineer are minimal. The producer exports nearly all of the manure or organic products from the farm. The CNMP is a conservation plan that addresses soil erosion, water quality, and air quality resource concerns on the AFO production area and land application areas owned or controlled by the AFO owner/operator. In this scenario, the primary focus will be addressing soil erosion, water quality, and air quality resource concerns present on the production area, including manure/wastewater handling and storage, and documentation of manure generation by the AFO, and its export. Production area components of the plan must include animal confinement facilities, feeding and lounging areas, animal mortality facilities, and manure containment and storage facilities. Planned practices on the production area must result in meeting NRCS planning criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner€™s/operator's production objectives.

**Before Situation:**

The owner/operator of the AFO has not received a written comprehensive nutrient management plan (CNMP) that addresses all resource concerns present on the facility production areas and any applicable land application areas. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Resource concerns on the AFO production area remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, erosion and runoff issues from feeding and lounging areas, and record keeping documentation of manure generation and exports. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and record keeping methods for inspection and monitoring of the existing CNMP-related practices, manure imports/exports may need further improvement.

**After Situation:**

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive conservation plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans) and to NRCS a the CNMP Case File that describes management and conservation practice practices to address all identified soil erosion, water quality, and air quality resource concerns on the AFO production area and any applicable land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventories/evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; minimize erosion and runoff from feeding and lounging areas, keep accurate AFO animal inventory information, and document AFO manure generation and exports. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Decisions selected in the Record of Decision will provide estimated quantities for conservation practices to be installed in units of measure that align with those in the conservation practice. Accurate record keeping documents for operation and maintenance of existing and new CNMP-related practices, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP.

**Feature Measure:** Each

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,835.85

**Scenario Cost/Unit:** $2,835.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 10 | $919.10 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 25 | $1,916.75 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #137 - CNMP Greater Than 300 AU with Land Application (Minimal Engineer Assistance)

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on an Animal Feeding Operation (AFO) of greater than or equal to 300 animal units (AU). This scenario is for sites or states where the services of a professional engineer are minimal. The producer may export modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland and applies most manure nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS planning criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

**Before Situation:**

The owner/operator of an AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and record keeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

**After Situation:**

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans) and to NRCS with the CNMP Case File data that describes management and conservation practices to address all identified soil erosion, water quality, and air quality resource concerns on the AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventories-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts. Practices selected in the Record of Decision will provide estimated quantities for conservation practices to be installed in units of measure that align with the practice standards. Accurate record keeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP.

**Feature Measure:** Each

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,362.20

**Scenario Cost/Unit:** $6,362.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 15 | $1,378.65 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 65 | $4,983.55 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #138 - CNMP Greater Than 300 AU without Land Application (Minimal Engineer Assistance)

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on an Animal Feeding Operation (AFO) of greater than 300 animal units (AU). This scenario is for sites or states where the services of a professional engineer are minimal. The producer exports nearly all of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The CNMP is a conservation plan that addresses the soil erosion, water quality, and air quality resource concerns on the AFO production area and land application areas owned or controlled by the AFO owner/operator. In this scenario, the primary focus will be addressing resource concerns present on the production area, including manure/wastewater handling and storage, and documentation of manure generation by the AFO, and its export. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Planned practices on the production area must result in meeting NRCS planning criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owners/operator's production objectives.

**Before Situation:**

The owner/operator of an AFO has not received a written comprehensive nutrient management plan (CNMP) that addresses the soil erosion, water quality, and air quality resource concerns present on the facility production areas and any applicable land application areas. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Resource concerns on the AFO production area remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, soil erosion, water quality, and air quality concerns from feeding and lounging areas, and record keeping documentation of manure generation and exports. Negative air quality impacts issues may remain on the AFO, and record keeping methods for inspection and monitoring of the existing CNMP-related practices, manure imports/exports may need further improvement.

**After Situation:**

A certified Technical Services Provider (TSP) has delivered to the AFO owner/operator, a comprehensive conservation plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans) and to NRCS a the CNMP Case File that describes management and conservation practice solutions to all identified resource concerns on the small sized AFO production area and any applicable land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems are inventoried/evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; minimize soil erosion, water quality, and air quality concerns from feeding and lounging areas, keep accurate AFO animal inventory information, and document AFO manure generation and exports. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts. Decisions selected in the Record of Decisions will provide estimated quantities for conservation practices to be installed in units of measure that align with those in the conservation practice. Accurate record keeping documents for operation and maintenance of existing and new CNMP-related practices, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP.

**Feature Measure:** Each

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,219.20

**Scenario Cost/Unit:** $3,219.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 10 | $919.10 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 30 | $2,300.10 |

**Practice:** 104 - Nutrient Management Plan - Written

**Scenario** #38 - Nutrient Management CAP Less Than or Equal to 100 Acres (Not part of a CNMP)

**Scenario Description:**

Various on-farm land uses where natural or artificial amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

**Before Situation:**

Agricultural producer has no plan or minimal knowledge for application and management of nutrients. The producer currently manages nutrient application based upon personal knowledge, or other local criteria. Producer is interested in management of nutrients to maximize yields, profits margin, reduce costs, and for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Nutrient Management" conservation activity plan consistent with the criteria in CAP 104 and 590 Nutrient Management. The CAP criteria requires the plan to meet quality criteria for the primary Water Quality resource concern and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 104 plan as cited in the NRCS Field Office Technical Guide and CPS 590 Nutrient Management.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,355.00

**Scenario Cost/Unit:** $2,355.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 30 | $2,355.00 |

**Practice:** 104 - Nutrient Management Plan - Written

**Scenario** #39 - Nutrient Management CAP 104- 101-300 Acres (Not part of a CNMP)

**Scenario Description:**

Various on-farm land uses where organic or inorganic amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

**Before Situation:**

Agricultural producer has no plan or minimal knowledge for applicant and management of land applied nutrients. The producer currently manages nutrient application based upon label instructions, personal knowledge, or other local criteria. Producer is interested in management of nutrients to maximize yields, profits margin, reduce costs, nutrient use efficiency and for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Nutrient Management" conservation activity plan. The CAP criteria requires the plan to meet Nutrient Management criteria for the primary Water Quality resource concern and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic criteria for the 104 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,140.00

**Scenario Cost/Unit:** $3,140.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 40 | $3,140.00 |

**Practice:** 104 - Nutrient Management Plan - Written

**Scenario** #40 - Nutrient Management CAP 104 Greater Than 300 Acres (Not part of a CNMP)

**Scenario Description:**

Various on-farm land uses where organic or inorganic amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

**Before Situation:**

Agricultural producer has no plan or minimal knowledge for applicant and management of land applied nutrients. The producer currently manages nutrient application based upon label instructions, personal knowledge, or other local criteria. Producer is interested in management of nutrients to maximize yields, profits margin, reduce costs, nutrient use efficiency, and for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Nutrient Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for the primary Water Quality resource concern and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic criteria for the 104 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,925.00

**Scenario Cost/Unit:** $3,925.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 50 | $3,925.00 |

**Practice:** 104 - Nutrient Management Plan - Written

**Scenario** #41 - Nutrient Management CAP 104 Less Than or Equal to 100 Acres (Element of a CNMP)

**Scenario Description:**

Various on-farm land uses where natural or artificial nutrient amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

**Before Situation:**

Agricultural producer has no plan or minimal knowledge for applicant and management of nutrient applied to the land. The producer currently manages nutrient application based upon label instructions, personal knowledge, or other local criteria. Producer is interested in management of nutrients to maximize yields, profits margin, reduce costs, and for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Nutrient Management" conservation activity plan. The CAP criteria requires the plan to meet nutrient criteria for the primary Water Quality resource concern in 590 and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic criteria for the 104 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,925.00

**Scenario Cost/Unit:** $3,925.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 50 | $3,925.00 |

**Practice:** 104 - Nutrient Management Plan - Written

**Scenario** #42 - Nutrient Management CAP 104 - 101-300 Acres (Element of a CNMP)

**Scenario Description:**

Various on-farm land uses where organic or inorganic amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

**Before Situation:**

Agricultural producer has no plan or minimal knowledge for applicant and management of applied nutrients to the land. The producer currently manages nutrient application based upon label instructions, personal knowledge, or other local criteria. Producer is interested in management of nutrients to maximize yields, profits margin, reduce costs, and for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Nutrient Management" conservation activity plan. The CAP criteria requires the plan to meet 590 criteria for the primary Water Quality resource concern and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 104 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,495.00

**Scenario Cost/Unit:** $5,495.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 70 | $5,495.00 |

**Practice:** 104 - Nutrient Management Plan - Written

**Scenario** #43 - Nutrient Management CAP 104 Greater Than 300 Acres (Element of a CNMP)

**Scenario Description:**

Various on-farm land uses where organic or inorganic amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

**Before Situation:**

Agricultural producer has no plan or minimal knowledge for applicant and management of nutrient s applied to the land. The producer currently manages nutrient application based upon label instructions, personal knowledge, or other local criteria. Producer is interested in management of nutrients to maximize yields, profits margin, reduce costs, and for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Nutrient Management" conservation activity plan. The CAP criteria requires the plan to meet 590 criteria for the primary Water Quality resource concern and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic criteria for the 104 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,672.50

**Scenario Cost/Unit:** $6,672.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 85 | $6,672.50 |

**Practice:** 106 - Forest Management Plan - Written

**Scenario** #44 - FMP Less Than or Equal to 20 acres

**Scenario Description:**

Non Industrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 1 to 20 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

**Before Situation:**

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concern(s) exist which are not addressed by a management plan. A Forest Management Plan or Conservation Activity Plan, as defined by EQIP regulation is needed to allow the producer to apply for financial assistance through EQIP or other programs to help implement needed conservation practices. Associated Practices: 472, 666, 654, 655,384, 394, 383, 379, 338, 391, 791, 490, 612, 660, 311, 380.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Forest Management Plan" Conservation Activity Plan (CAP). The CAP criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CAP is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CAP plan criteria is detailed in the Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,413.79

**Scenario Cost/Unit:** $1,413.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 19 | $1,413.79 |

**Practice:** 106 - Forest Management Plan - Written

**Scenario** #45 - FMP 21 to 100 acres

**Scenario Description:**

Non Industrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 21 to 100 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

**Before Situation:**

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concern(s) exist which are not addressed by a management plan. A Forest Management Plan or Conservation Activity Plan, as defined by EQIP regulation is needed to allow the producer to apply for financial assistance through EQIP or other programs to help implement needed conservation practices. Associated Practices: 472, 666, 654, 655,384, 394, 383, 379, 338, 391, 791, 490, 612, 660, 311, 380.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Forest Management Plan" Conservation Activity Plan (CAP). The CAP criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CAP is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CAP plan criteria is detailed in the Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,785.84

**Scenario Cost/Unit:** $1,785.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 24 | $1,785.84 |

**Practice:** 106 - Forest Management Plan - Written

**Scenario** #46 - FMP 101 to 250 acres

**Scenario Description:**

Non Industrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 101 to 250 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

**Before Situation:**

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concern(s) exist which are not addressed by a management plan. A Forest Management Plan or Conservation Activity Plan, as defined by EQIP regulation is needed to allow the producer to apply for financial assistance through EQIP or other programs to help implement needed conservation practices. Associated Practices: 472, 666, 654, 655,384, 394, 383, 379, 338, 391, 791, 490, 612, 660, 311, 380.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Forest Management Plan" Conservation Activity Plan (CAP). The CAP criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CAP is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CAP plan criteria is detailed in the Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,199.63

**Scenario Cost/Unit:** $3,199.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 43 | $3,199.63 |

**Practice:** 106 - Forest Management Plan - Written

**Scenario** #47 - FMP Greater Than 1000 acres

**Scenario Description:**

Non Industrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 1001 acres or greater in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

**Before Situation:**

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concern(s) exist which are not addressed by a management plan. A Forest Management Plan or Conservation Activity Plan, as defined by EQIP regulation is needed to allow the producer to apply for financial assistance through EQIP or other programs to help implement needed conservation practices. Associated Practices: 472, 666, 654, 655,384, 394, 383, 379, 338, 391, 791, 490, 612, 660, 311, 380.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Forest Management Plan" Conservation Activity Plan (CAP). The CAP criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CAP is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CAP plan criteria is detailed in the Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,696.90

**Scenario Cost/Unit:** $6,696.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 90 | $6,696.90 |

**Practice:** 106 - Forest Management Plan - Written

**Scenario** #48 - FMP 251 to 500 acres

**Scenario Description:**

Non Industrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 251 to 500 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

**Before Situation:**

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concern(s) exist which are not addressed by a management plan. A Forest Management Plan or Conservation Activity Plan, as defined by EQIP regulation is needed to allow the producer to apply for financial assistance through EQIP or other programs to help implement needed conservation practices. Associated Practices: 472, 666, 654, 655,384, 394, 383, 379, 338, 391, 791, 490, 612, 660, 311, 380.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Forest Management Plan" Conservation Activity Plan (CAP). The CAP criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CAP is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CAP plan criteria is detailed in the Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,613.42

**Scenario Cost/Unit:** $4,613.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 62 | $4,613.42 |

**Practice:** 106 - Forest Management Plan - Written

**Scenario** #49 - FMP 501 to 1000 acres

**Scenario Description:**

Non Industrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 501 to 1000 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

**Before Situation:**

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concern(s) exist which are not addressed by a management plan. A Forest Management Plan or Conservation Activity Plan, as defined by EQIP regulation is needed to allow the producer to apply for financial assistance through EQIP or other programs to help implement needed conservation practices. Associated Practices: 472, 666, 654, 655,384, 394, 383, 379, 338, 391, 791, 490, 612, 660, 311, 380.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Forest Management Plan" Conservation Activity Plan (CAP). The CAP criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CAP is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CAP plan criteria is detailed in the Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,357.52

**Scenario Cost/Unit:** $5,357.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 72 | $5,357.52 |

**Practice:** 108 - Feed Management Plan - Written

**Scenario** #49 - Feed Management Plan

**Scenario Description:**

The owner/operator of an Animal Feeding Operation (AFO) has not received a written Feed Management Plan (FeedMP) that addresses all resource concerns present on the facility. Various levels of management and conservation implementation has occurred in the operation. Little documentation of the methods of feed management used and practices installed exists, and the producer is not likely to developed a complete forage inventory or nutrient analysis. The producer may or may not have a conservation plan or a nutrient management plan. Nutrient management related resource concerns on the operation remain to be addressed through the development of a complete FeedMP including management and conservation practices for proper quantity and quality of available nutrients, feedstuffs, and/or additives fed to livestock or poultry that may be present on the operation. Present operation and feed methodology poses risk of feeding excessive amounts of nutrients in animal manure which result in negative impacts to water quality and odor resource concerns. Negative water and air quality impacts as well as farmstead safety and security issues may remain on the AFO, and inadequate recordkeeping nutrient, inspection and monitoring of the existing operation may need further improvement.

**Before Situation:**

Producer has no plan or limited knowledge of management of feed, nutrients, feedstuffs, or nutritional additives provided to domestic livestock and poultry. The producer currently manages feed without a plan which would address livestock production limitations and water and air quality resource concern impacts. Producer currently lacks plan to provide proper balance of forage, grains or other feeds and supplements to assure domestic animal nutritional needs are met without negatively impacting water and air quality. Producer is interested in management of feed for domestic animals to maximize profit margin, reduce costs, improve or address livestock production opportunities, and for other environmental benefits. Producer is willing to collaborate with a certified Technical Service Provider (TSP) to develop a plan, and to collect/coordinate data and records to determine current nutritional needs. Associated Practice(s): 590-Nutrient Management

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the “Feed Management” (FM) conservation activity plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable natural resource concerns and provides for opportunities to identify and implement conservation practices related to management of feed, forages, or delivery of supplements to maximize efficient feeding operations and livestock growth. The CAP plan may serve as the basis for implementation of the primary conservation practice 592-Feed Management. If applicable, the FM CAP may also be developed to complement Comprehensive Nutrient Management Plans (CNMP) or to help meet requirements of NRCS practice standard 590 - Nutrient Management. As addressed in the CAP planning criteria, the plan may include recommendations for addressing associated natural resource concerns with other conservation practices. The FM CAP meets the basic quality criteria for the 108 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,840.08

**Scenario Cost/Unit:** $1,840.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 24 | $1,840.08 |

**Practice:** 110 - Grazing Management Plan - Written

**Scenario** #1 - Grazing Management Plan Less Than or Equal to 100 acres

**Scenario Description:**

Small agricultural operation with less than 100 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

**Before Situation:**

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margin, reduce costs, improve or address wildlife opportunities, and for other environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: In addition to the essential practices listed previously, addition practices to consider include: Channel Bank Vegetation, Prescribed Burning, Critical Area Planting, Pond, Windbreak/Shelterbelt Establishment, Silvopasture Establishment, Riparian Herbaceous Cover, Stream Habitat Improvement and Management, Pipeline, Heavy Use Area Protection, Spring Development, and Animal Trails and Walkways.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Grazing Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Control, Nutrient Management, Forage and Biomass Planting, Prescribed Grazing, Range Planting, Access Control, and Watering Facilities. As addressed in the CAP criteria, the plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 110 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,308.20

**Scenario Cost/Unit:** $2,308.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, range conservation | 1299 | Conservation Activity Plan labor to study, plan the use and management of rangelands to maximize their use in a sustainable manner. Range managers may inventory soils, plants, and animals; develop resource management plans; identify monitoring methods and collect data using those methods to determine if resource management objectives are being met or if adjustments to management activities are needed. For example, they may help ranchers attain optimum livestock production by determining the number and kind of animals to graze, the grazing system to use, and the best season for grazing. Cost associated with this component includes overhead and benefits (market price). | Hour | $76.94 | 30 | $2,308.20 |

**Practice:** 110 - Grazing Management Plan - Written

**Scenario** #2 - Grazing Management Plan 101 to 500 acres

**Scenario Description:**

Small agricultural operation with 101 to 500 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

**Before Situation:**

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margin, reduce costs, improve or address wildlife opportunities, and for other environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: In addition to the essential practices listed previously, addition practices to consider include: Channel Bank Vegetation, Prescribed Burning, Critical Area Planting, Pond, Windbreak/Shelterbelt Establishment, Silvopasture Establishment, Riparian Herbaceous Cover, Stream Habitat Improvement and Management, Pipeline, Heavy Use Area Protection, Spring Development, and Animal Trails and Walkways.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Grazing Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Control, Nutrient Management, Forage and Biomass Planting, Prescribed Grazing, Range Planting, Access Control, and Watering Facilities. As addressed in the CAP criteria, the plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 110 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,077.60

**Scenario Cost/Unit:** $3,077.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, range conservation | 1299 | Conservation Activity Plan labor to study, plan the use and management of rangelands to maximize their use in a sustainable manner. Range managers may inventory soils, plants, and animals; develop resource management plans; identify monitoring methods and collect data using those methods to determine if resource management objectives are being met or if adjustments to management activities are needed. For example, they may help ranchers attain optimum livestock production by determining the number and kind of animals to graze, the grazing system to use, and the best season for grazing. Cost associated with this component includes overhead and benefits (market price). | Hour | $76.94 | 40 | $3,077.60 |

**Practice:** 110 - Grazing Management Plan - Written

**Scenario** #3 - Grazing Management Plan 1501 to 5000 acres

**Scenario Description:**

Small agricultural operation with 1501 to 5000 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

**Before Situation:**

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margin, reduce costs, improve or address wildlife opportunities, and for other environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: In addition to the essential practices listed previously, addition practices to consider include: Channel Bank Vegetation, Prescribed Burning, Critical Area Planting, Pond, Windbreak/Shelterbelt Establishment, Silvopasture Establishment, Riparian Herbaceous Cover, Stream Habitat Improvement and Management, Pipeline, Heavy Use Area Protection, Spring Development, and Animal Trails and Walkways.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Grazing Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Control, Nutrient Management, Forage and Biomass Planting, Prescribed Grazing, Range Planting, Access Control, and Watering Facilities. As addressed in the CAP criteria, the plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 110 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,616.40

**Scenario Cost/Unit:** $4,616.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, range conservation | 1299 | Conservation Activity Plan labor to study, plan the use and management of rangelands to maximize their use in a sustainable manner. Range managers may inventory soils, plants, and animals; develop resource management plans; identify monitoring methods and collect data using those methods to determine if resource management objectives are being met or if adjustments to management activities are needed. For example, they may help ranchers attain optimum livestock production by determining the number and kind of animals to graze, the grazing system to use, and the best season for grazing. Cost associated with this component includes overhead and benefits (market price). | Hour | $76.94 | 60 | $4,616.40 |

**Practice:** 110 - Grazing Management Plan - Written

**Scenario** #5 - Grazing Management Plan Greater Than 5000 acres

**Scenario Description:**

Small agricultural operation with more than 5000 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

**Before Situation:**

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margin, reduce costs, improve or address wildlife opportunities, and for other environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: In addition to the essential practices listed previously, addition practices to consider include: Channel Bank Vegetation, Prescribed Burning, Critical Area Planting, Pond, Windbreak/Shelterbelt Establishment, Silvopasture Establishment, Riparian Herbaceous Cover, Stream Habitat Improvement and Management, Pipeline, Heavy Use Area Protection, Spring Development, and Animal Trails and Walkways.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Grazing Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Control, Nutrient Management, Forage and Biomass Planting, Prescribed Grazing, Range Planting, Access Control, and Watering Facilities. As addressed in the CAP criteria, the plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 110 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,385.80

**Scenario Cost/Unit:** $5,385.80

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, range conservation | 1299 | Conservation Activity Plan labor to study, plan the use and management of rangelands to maximize their use in a sustainable manner. Range managers may inventory soils, plants, and animals; develop resource management plans; identify monitoring methods and collect data using those methods to determine if resource management objectives are being met or if adjustments to management activities are needed. For example, they may help ranchers attain optimum livestock production by determining the number and kind of animals to graze, the grazing system to use, and the best season for grazing. Cost associated with this component includes overhead and benefits (market price). | Hour | $76.94 | 70 | $5,385.80 |

**Practice:** 110 - Grazing Management Plan - Written

**Scenario** #66 - Grazing Management Plan 501 to 1500 acres

**Scenario Description:**

Small agricultural operation with 501 to 1500 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

**Before Situation:**

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margin, reduce costs, improve or address wildlife opportunities, and for other environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: In addition to the essential practices listed previously, addition practices to consider include: Channel Bank Vegetation, Prescribed Burning, Critical Area Planting, Pond, Windbreak/Shelterbelt Establishment, Silvopasture Establishment, Riparian Herbaceous Cover, Stream Habitat Improvement and Management, Pipeline, Heavy Use Area Protection, Spring Development, and Animal Trails and Walkways.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Grazing Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Control, Nutrient Management, Forage and Biomass Planting, Prescribed Grazing, Range Planting, Access Control, and Watering Facilities. As addressed in the CAP criteria, the plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 110 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number of plans

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,847.00

**Scenario Cost/Unit:** $3,847.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, range conservation | 1299 | Conservation Activity Plan labor to study, plan the use and management of rangelands to maximize their use in a sustainable manner. Range managers may inventory soils, plants, and animals; develop resource management plans; identify monitoring methods and collect data using those methods to determine if resource management objectives are being met or if adjustments to management activities are needed. For example, they may help ranchers attain optimum livestock production by determining the number and kind of animals to graze, the grazing system to use, and the best season for grazing. Cost associated with this component includes overhead and benefits (market price). | Hour | $76.94 | 50 | $3,847.00 |

**Practice:** 112 - Prescribed Burning Plan - Written

**Scenario** #9 - Prescribed Burning Plan Less Than or Equal to 20 Acres

**Scenario Description:**

Non Industrial Private Forest Land, Pasture or Range Land typically less than or equal to 20 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

**Before Situation:**

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. Due to the size, landscape position, low to moderate fuel loads and presence of both natural firebreaks (i.e. – streams, lakes, etc.) and man-made firebreaks (i.e. – roads, farm paths, agricultural fields, etc.), few newly constructed firebreaks are needed to implement the prescribed burn. A Prescribed Burning Plan or Conservation Activity Plan is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in order to implement needed conservation practices. Associated Practices: 394, 383, 384, 528, 314, 315, 550, 644, 645, 659, 342, 647, 460, 643, 666, 595

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the “Prescribed Burning Plan” Conservation Activity Plan (CAP). The CAP criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan CAP is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The CAP plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e. - site preparation, wildlife habitat, etc.), site conditions (i.e. - fuel load, fuel type, etc.), implementation strategies (i.e. - method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e. - wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional CAP plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $372.05

**Scenario Cost/Unit:** $372.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 5 | $372.05 |

**Practice:** 112 - Prescribed Burning Plan - Written

**Scenario** #68 - Prescribed Burning Plan 21-100 Acres

**Scenario Description:**

Non Industrial Private Forest Land, Pasture or Range Land typically 21 to 100 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

**Before Situation:**

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. Due to the size, landscape position, low to moderate fuel loads and presence of both natural firebreaks (i.e. – streams, lakes, etc.) and man-made firebreaks (i.e. – roads, farm paths, agricultural fields, etc.), few newly constructed firebreaks are needed to implement the prescribed burn. A Prescribed Burning Plan or Conservation Activity Plan is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in order to implement needed conservation practices. Associated Practices: 394, 383, 384, 528, 314, 315, 550, 644, 645, 659, 342, 647, 460, 643, 666, 595

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the “Prescribed Burning Plan” Conservation Activity Plan (CAP). The CAP criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan CAP is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The CAP plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e. - site preparation, wildlife habitat, etc.), site conditions (i.e. - fuel load, fuel type, etc.), implementation strategies (i.e. - method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e. - wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional CAP plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $595.28

**Scenario Cost/Unit:** $595.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 8 | $595.28 |

**Practice:** 112 - Prescribed Burning Plan - Written

**Scenario** #69 - Prescribed Burning Plan 101-250 Acres

**Scenario Description:**

Non Industrial Private Forest Land, Pasture or Range Land typically 101 to 250 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

**Before Situation:**

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. Due to the size, landscape position, low to moderate fuel loads and presence of both natural firebreaks (i.e. – streams, lakes, etc.) and man-made firebreaks (i.e. – roads, farm paths, agricultural fields, etc.), few newly constructed firebreaks are needed to implement the prescribed burn. A Prescribed Burning Plan or Conservation Activity Plan is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in order to implement needed conservation practices. Associated Practices: 394, 383, 384, 528, 314, 315, 550, 644, 645, 659, 342, 647, 460, 643, 666, 595

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the “Prescribed Burning Plan” Conservation Activity Plan (CAP). The CAP criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan CAP is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The CAP plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e. - site preparation, wildlife habitat, etc.), site conditions (i.e. - fuel load, fuel type, etc.), implementation strategies (i.e. - method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e. - wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional CAP plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $892.92

**Scenario Cost/Unit:** $892.92

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 12 | $892.92 |

**Practice:** 112 - Prescribed Burning Plan - Written

**Scenario** #70 - Prescribed Burning Plan 501-1000 Acres

**Scenario Description:**

Non Industrial Private Forest Land, Pasture or Range Land typically 501 to 1000 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

**Before Situation:**

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. Due to the size, landscape position, low to moderate fuel loads and presence of both natural firebreaks (i.e. – streams, lakes, etc.) and man-made firebreaks (i.e. – roads, farm paths, agricultural fields, etc.), few newly constructed firebreaks are needed to implement the prescribed burn. A Prescribed Burning Plan or Conservation Activity Plan is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in order to implement needed conservation practices. Associated Practices: 394, 383, 384, 528, 314, 315, 550, 644, 645, 659, 342, 647, 460, 643, 666, 595

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the “Prescribed Burning Plan” Conservation Activity Plan (CAP). The CAP criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan CAP is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The CAP plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e. - site preparation, wildlife habitat, etc.), site conditions (i.e. - fuel load, fuel type, etc.), implementation strategies (i.e. - method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e. - wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional CAP plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,488.20

**Scenario Cost/Unit:** $1,488.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 20 | $1,488.20 |

**Practice:** 112 - Prescribed Burning Plan - Written

**Scenario** #71 - Prescribed Burning Plan Greater Than 1000 Acres

**Scenario Description:**

Non Industrial Private Forest Land, Pasture or Range Land typically greater than 1000 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

**Before Situation:**

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. Due to the size, landscape position, low to moderate fuel loads and presence of both natural firebreaks (i.e. – streams, lakes, etc.) and man-made firebreaks (i.e. – roads, farm paths, agricultural fields, etc.), few newly constructed firebreaks are needed to implement the prescribed burn. A Prescribed Burning Plan or Conservation Activity Plan is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in order to implement needed conservation practices. Associated Practices: 394, 383, 384, 528, 314, 315, 550, 644, 645, 659, 342, 647, 460, 643, 666, 595

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the “Prescribed Burning Plan” Conservation Activity Plan (CAP). The CAP criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan CAP is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The CAP plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e. - site preparation, wildlife habitat, etc.), site conditions (i.e. - fuel load, fuel type, etc.), implementation strategies (i.e. - method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e. - wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional CAP plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,785.84

**Scenario Cost/Unit:** $1,785.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 24 | $1,785.84 |

**Practice:** 112 - Prescribed Burning Plan - Written

**Scenario** #72 - Prescribed Burning Plan 251-500 Acres

**Scenario Description:**

Non Industrial Private Forest Land, Pasture or Range Land typically 251 to 500 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

**Before Situation:**

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. Due to the size, landscape position, low to moderate fuel loads and presence of both natural firebreaks (i.e. – streams, lakes, etc.) and man-made firebreaks (i.e. – roads, farm paths, agricultural fields, etc.), few newly constructed firebreaks are needed to implement the prescribed burn. A Prescribed Burning Plan or Conservation Activity Plan is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in order to implement needed conservation practices. Associated Practices: 394, 383, 384, 528, 314, 315, 550, 644, 645, 659, 342, 647, 460, 643, 666, 595

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the “Prescribed Burning Plan” Conservation Activity Plan (CAP). The CAP criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan CAP is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The CAP plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e. - site preparation, wildlife habitat, etc.), site conditions (i.e. - fuel load, fuel type, etc.), implementation strategies (i.e. - method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e. - wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional CAP plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,190.56

**Scenario Cost/Unit:** $1,190.56

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 16 | $1,190.56 |

**Practice:** 114 - Integrated Pest Management Plan - Written

**Scenario** #20 - IPM Management CAP Small-Specialty Less Than 50 Acres

**Scenario Description:**

Various on-farm land uses where pests are managed on smaller operations, including organic and specialty crop operations where more complicated pest management evaluations and solutions may be necessary. Current pest control activities cause environmental concerns with water quality and/or erosion. Natural Resource Concern: Water quality and all other appropriate resource concerns.

**Before Situation:**

Agricultural currently producer has no plan or limited knowledge of development or management of agricultural pests. The producer currently manages pests based upon pesticide label instructions, personal knowledge, or other local criteria. Producer is interested in management of pests and reduce the environmental impacts for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: Integrated Pest Management, Crop Rotation, Cover Crop, Field Boarder, Filter Strip, Stripcropping, and Residue and Tillage management practices, or other application conservation practices cited tin the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Integrated Pest Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to utilize the following strategies: Prevention, Avoidance, Monitoring, and Suppression, which will be implemented through use of "Integrated Pest Management and may use one or more conservation practices and/or risk reduction strategies. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 114 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,962.50

**Scenario Cost/Unit:** $1,962.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 25 | $1,962.50 |

**Practice:** 114 - Integrated Pest Management Plan - Written

**Scenario** #21 - IPM Management CAP Medium 51 - 250 Acres

**Scenario Description:**

Various on-farm land uses where pests are managed on a moderately-sized farm where IPM is to be applied. Current pest control activities cause environmental concerns with water quality and/or erosion. Natural Resource Concern: Water quality and all other appropriate resource concerns.

**Before Situation:**

Agricultural currently producer has no plan or limited knowledge of development or management of agricultural pests. The producer currently manages pests based upon pesticide label instructions, personal knowledge, or other local criteria. Producer is interested in management of pests and reduce the environmental impacts for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: Integrated Pest Management, Crop Rotation, Cover Crop, Field Boarder, Filter Strip, Stripcropping, and Residue and Tillage management practices, or other application conservation practices cited tin the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Integrated Pest Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to utilize the following strategies: Prevention, Avoidance, Monitoring, and Suppression, which will be implemented through use of "Integrated Pest Management and may use one or more conservation practices and/or risk reduction strategies. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 114 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,512.00

**Scenario Cost/Unit:** $2,512.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 32 | $2,512.00 |

**Practice:** 114 - Integrated Pest Management Plan - Written

**Scenario** #22 - IPM Management CAP Large - Greater Than 250 Acres

**Scenario Description:**

Various on-farm land uses where pests are managed on a larger farm where IPM strategies are to be applied. Current pest control activities cause environmental concerns with water quality and/or erosion. Natural Resource Concern: Water quality and all other appropriate resource concerns.

**Before Situation:**

Agricultural currently producer has no plan or limited knowledge of development or management of agricultural pests. The producer currently manages pests based upon pesticide label instructions, personal knowledge, or other local criteria. Producer is interested in management of pests and reduce the environmental impacts for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: Integrated Pest Management, Crop Rotation, Cover Crop, Field Boarder, Filter Strip, Stripcropping, and Residue and Tillage management practices, or other application conservation practices cited tin the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Integrated Pest Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to utilize the following strategies: Prevention, Avoidance, Monitoring, and Suppression, which will be implemented through use of "Integrated Pest Management and may use one or more conservation practices and/or risk reduction strategies. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 114 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,925.00

**Scenario Cost/Unit:** $3,925.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 50 | $3,925.00 |

**Practice:** 118 - Irrigation Water Management Plan - Written

**Scenario** #8 - Irrigation Water Management Conservation Activity Plan CAP

**Scenario Description:**

Agricultural operations supported with existing irrigation systems. Natural Resource Concern: Water quantity and all other appropriate resource concerns.

**Before Situation:**

Currently producer has no plan or limited knowledge for management of water application to meet crop needs and address identified resource concerns. The producer currently manages water application based upon personal knowledge, or other local criteria. Producer is interested in management of irrigation water to maximize yields, profit margin, reduce costs, and for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: Irrigation Water Management (449); Irrigation System (442); Irrigation System, Surface & Subsurface (443); Irrigation Pipeline (430); Irrigation Ditch Lining (428); Irrigation Field Ditch (388); Irrigation Canal or Lateral (320); Structure for Water Control (587); Irrigation Reservoir (436); Irrigation System, Tailwater Recovery (447); Pumping Plant (533); Irrigation Land Leveling (464); Anionic Polyacrylamide (PM) Application (450); Salinity and Sodic Soil Management (590); Nutrient Management (590); Waste Utilization (633); or other applicable conservation practices in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Irrigation Water Management" conservation activity plan to control the volume, frequency, and rate of water for efficient irrigation and to address other resource concerns. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 118 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,216.85

**Scenario Cost/Unit:** $3,216.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 35 | $3,216.85 |

**Practice:** 118 - Irrigation Water Management Plan - Written

**Scenario** #17 - Irrigation Water Management CAP with pump test

**Scenario Description:**

Agricultural operations supported with existing irrigation systems. Natural Resource Concern: Water quantity and all other appropriate resource concerns.

**Before Situation:**

Currently producer has no plan or limited knowledge for management of water application to meet crop needs and address identified resource concerns. The producer currently manages water application based upon personal knowledge, or other local criteria. The pump for the irrigation system is of unknown performance. Producer is interested in management of irrigation water to maximize yields, profit margin, reduce costs, and for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: Irrigation Water Management (449); Irrigation System (442); Irrigation System, Surface & Subsurface (443); Irrigation Pipeline (430); Irrigation Ditch Lining (428); Irrigation Field Ditch (388); Irrigation Canal or Lateral (320); Structure for Water Control (587); Irrigation Reservoir (436); Irrigation System, Tailwater Recovery (447); Pumping Plant (533); Irrigation Land Leveling (464); Anionic Polyacrylamide (PM) Application (450); Salinity and Sodic Soil Management (590); Nutrient Management (590); Waste Utilization (633); or other applicable conservation practices in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Irrigation Water Management" conservation activity plan to control the volume, frequency, and rate of water for efficient irrigation and to address other resource concerns. Because a pump test was performed, a new pump that operates more efficiently and matches the irrigation system has been analyzed and could possibly be installed such that less water and energy are consumed. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 118 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Acre

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,055.05

**Scenario Cost/Unit:** $5,055.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 55 | $5,055.05 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #53 - AgEMP Small, One Enterprise

**Scenario Description:**

Typical operation has either < 300 Acres < 300 AU Up to 2 irrigation pumps <20,000 sq ft of heater greenhouse, or A maple syrup enterprise One enterprise as defined in the ASABE S612 Standard on-farm energy audit standard. A small operation is as described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource: Energy Conservation

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer currently manages a small operation as described above. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Agricultural Energy Management Plan". The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,106.39

**Scenario Cost/Unit:** $2,106.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 9 | $827.19 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $41.34 | 17 | $702.78 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $28.28 | 1.5 | $42.42 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $44.50 | 12 | $534.00 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #54 - AgEMP Medium, One Enterprise

**Scenario Description:**

Typical operation has either 301 to 2500 Ac 301 to 1000 AU 3 to 6 Irrigation Pumps, or 20,001 to 40,000 sq ft heated greenhouse One enterprise as defined in the ASABE S612 Standard on-farm energy audit standard. A medium operation as described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource: Energy Conservation

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer currently manages a medium small operation with enterprise described above. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement or other applicable practices approved in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Agricultural Energy Management Plan". The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,615.60

**Scenario Cost/Unit:** $2,615.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 12 | $1,102.92 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $41.34 | 18 | $744.12 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $28.28 | 2 | $56.56 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $44.50 | 16 | $712.00 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #55 - AgEMP Large, One Enterprise

**Scenario Description:**

Typical operation has either > 2,500 Ac > 1000 AU More than 7 irrigation pumps or > 40,001 sq ft of heater greenhouse One enterprise as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a large operation with one enterprise, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource: Energy Conservation.

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer currently manages a large operation with enterprise described above. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement or other applicable practices approved in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Agricultural Energy Management Plan". The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,444.79

**Scenario Cost/Unit:** $3,444.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 19 | $1,746.29 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $41.34 | 20 | $826.80 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $28.28 | 2.5 | $70.70 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $44.50 | 18 | $801.00 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #56 - AgEMP Small, Two Enterprise

**Scenario Description:**

Typical operation has either <300 Ac <300 AU Up to 2 irrigation pumps, or <20,000 sq ft heated greenhouse Two enterprises as defined in the ASABE S612 Standard on-farm energy audit standard. A small operation as described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource: Energy Conservation

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any type small sized operation with two enterprises will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Agricultural Energy Management Plan". The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,251.99

**Scenario Cost/Unit:** $3,251.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 15 | $1,378.65 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $41.34 | 21 | $868.14 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $28.28 | 2.5 | $70.70 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $44.50 | 21 | $934.50 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #57 - AgEMP Medium Two Enterprises

**Scenario Description:**

Typical operation has either 301 to 2500 Ac 301 to 1000 AU 3 to 6 Irrigation Pumps, or 20,001 to 40,000 sq ft heated greenhouse Two enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a medium operation, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource: Energy Conservation

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any operation with two enterprises will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Agricultural Energy Management Plan". The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,397.59

**Scenario Cost/Unit:** $4,397.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 21 | $1,930.11 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $41.34 | 25 | $1,033.50 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $28.28 | 3.5 | $98.98 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $44.50 | 30 | $1,335.00 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #58 - AgEMP Large, Two Enterprises

**Scenario Description:**

Typical operation has either > 2,500 Ac > 1000 AU More than 7 irrigation pumps or > 40,001 sq ft of heater greenhouse Two enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a large operation, one of which is described above . Multiple irrigation systems or a mixture of irrigation types may be counted as one of extra enterprises. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource: Energy Conservation

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any operation with two enterprises (complex or multiple irrigation systems can count as one of the extra enterprises) will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. An EMP is developed to assist an owner/operator in meeting all applicable local, tribal, State, and Federal water quality goals or regulations. Associated Practices: 449 Irrigation Water Management, 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Agricultural Energy Management Plan". The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,002.74

**Scenario Cost/Unit:** $6,002.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 32 | $2,941.12 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $41.34 | 29 | $1,198.86 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $28.28 | 4.5 | $127.26 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $44.50 | 39 | $1,735.50 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #59 - AgEMP Small, Three Enterprise

**Scenario Description:**

Typical operation has either < 300 Acres < 300 AU Up to 2 irrigation pumps <20,000 sq ft of heater greenhouse, or Three enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a small operation, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any type of operation with three enterprises will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). Producer is willing to collaborate with a certified TSP to develop an AgEMP 122 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Agricultural Energy Management Plan". The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,761.20

**Scenario Cost/Unit:** $3,761.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 18 | $1,654.38 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $41.34 | 22 | $909.48 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $28.28 | 3 | $84.84 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $44.50 | 25 | $1,112.50 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #60 - AgEMP Large, Three Enterprise

**Scenario Description:**

Typical operation has either > 2,500 Ac > 1000 AU More than 7 irrigation pumps or > 40,001 sq ft of heater greenhouse Three enterprise as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a large operation, one of which is described above. Multiple irrigation systems or a mixture of irrigation types may be counted as one of extra enterprises. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation.

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any type operation with three enterprises (complex or multiple irrigation systems can count as one of the extra enterprises) will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 449 Irrigation Water Management, 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Agricultural Energy Management Plan". The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,603.86

**Scenario Cost/Unit:** $6,603.86

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 36 | $3,308.76 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $41.34 | 30 | $1,240.20 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $28.28 | 5 | $141.40 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $44.50 | 43 | $1,913.50 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #62 - AgEMP Small, Four Enterprises

**Scenario Description:**

Typical operation has either < 300 Acres < 300 AU Up to 2 irrigation pumps, or <20,000 sq ft of heater greenhouse Four enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with an small operation, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation.

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any operation with four enterprises will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Agricultural Energy Management Plan". The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,590.39

**Scenario Cost/Unit:** $4,590.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 25 | $2,297.75 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $41.34 | 24 | $992.16 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $28.28 | 3.5 | $98.98 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $44.50 | 27 | $1,201.50 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #63 - AgEMP 128 Medium, Four Enterprise

**Scenario Description:**

Typical operation has either 301 to 2500 Ac 301 to 1000 AU 3 to 6 Irrigation Pumps, or 20,001 to 40,000 sq ft heated greenhouse Four enterprise as defined in the ASABE S612 Standard on-farm energy audit standard in combination with an medium operation, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation.

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any type of operation with four or more enterprises will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). Producer is willing to collaborate with a certified TSP to develop an AgEMP 122 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Agricultural Energy Management Plan". The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,735.99

**Scenario Cost/Unit:** $5,735.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 31 | $2,849.21 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $41.34 | 28 | $1,157.52 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $28.28 | 4.5 | $127.26 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $44.50 | 36 | $1,602.00 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #64 - AgEMP 128 Large, Four Enterprise

**Scenario Description:**

Typical operation has either > 2,500 Ac > 1000 AU More than 7 irrigation pumps or > 40,001 sq ft of heater greenhouse Four enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with an large livestock operation, one of which is described above. . Multiple irrigation systems or a mixture of irrigation types may be counted as one of extra enterprises. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation.

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any type of livestock operation with two non-livestock enterprises (complex or multiple irrigation systems can count as one of the extra enterprises) will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 449 Irrigation Water Management, 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Agricultural Energy Management Plan". The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,524.96

**Scenario Cost/Unit:** $7,524.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 44 | $4,044.04 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $41.34 | 32 | $1,322.88 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $28.28 | 5.5 | $155.54 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $44.50 | 45 | $2,002.50 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #173 - AgEMP Medium, Three Enterprise

**Scenario Description:**

Typical operation has either 301 to 2500 Ac 301 to 1000 AU 3 to 6 Irrigation Pumps, or 20,001 to 40,000 sq ft heated greenhouse Three enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a medium operation, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation.

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any type of operation with three enterprises will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Agricultural Energy Management Plan". The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,906.80

**Scenario Cost/Unit:** $4,906.80

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 24 | $2,205.84 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $41.34 | 26 | $1,074.84 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $28.28 | 4 | $113.12 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $44.50 | 34 | $1,513.00 |

**Practice:** 130 - Drainage Water Management Plan - Written

**Scenario** #13 - DWMP - Tile Map Available

**Scenario Description:**

A Drainage Water Management Plan (DWMP) will be developed on a relatively flat crop field with a patterned drainage system, where a map of the tile system is available. The DWMP will document soil, topographic, and drainage system maps of the site, and identify the number and location of water control structures that are needed to implement drainage water management according to Field Office Technical Guide standards. The DWMP will also provide guidelines for management of the water control structures to achieve desired resource outcomes.

**Before Situation:**

Producer has no plan for or knowledge of managing drainage water. The producer does not manage the field for the purpose of controlling water retention during the crop season and therefore crop yields are reduced. Existing ditches and/or tile drains on the cropland field currently conduct flow off field to waterways resulting in potential water quality resource concerns related to excessive nitrogen.

**After Situation:**

A certified Technical Service Provider (TSP) develops the "Drainage Water Management" conservation activity plan (CAP). The DWMP documents soil, topographic, and drainage system maps of the site, and identifies the number and location of water control structures that are needed to implement drainage water management according to Field Office Technical Guide standards. The DWMP also provides guidelines for management of the water control structures to achieve desired resource outcomes. The plan is ready for implementation with structural measures and management once the structures are installed. No actual benefits to resource concerns are achieved until the practices in the DWMP are implemented.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,732.47

**Scenario Cost/Unit:** $2,732.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, small surveying crew | 1296 | Conservation Activity Plan labor to perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. Cost associated with this component includes two man field crew, equipment, vehicle, overhead, and miscellaneous supplies. | Hour | $108.19 | 8 | $865.52 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 13 | $996.71 |
| Cap Labor, Survey and Mapping Technician | 1591 | Conservation Activity Plan labor to perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. May verify accuracy and completeness of maps. | Hour | $54.39 | 16 | $870.24 |

**Practice:** 130 - Drainage Water Management Plan - Written

**Scenario** #14 - DWMP - No Tile Map Available

**Scenario Description:**

A Drainage Water Management Plan (DWMP) will be developed on a relatively flat crop field with a patterned drainage system, where no map of the tile system is available. The DWMP will document soil, topographic, and drainage system maps of the site, and identify the number and location of water control structures that are needed to implement drainage water management according to Field Office Technical Guide standards. The DWMP will also provide guidelines for management of the water control structures to achieve desired resource outcomes.

**Before Situation:**

Producer has no plan for or knowledge of managing drainage water. The producer does not manage the field for the purpose of controlling water retention during the crop season and therefore crop yields are reduced. Existing ditches and/or tile drains on the cropland field currently conduct flow off field to waterways resulting in potential water quality resource concerns related to excessive nitrogen.

**After Situation:**

A certified Technical Service Provider (TSP) develops the "Drainage Water Management" conservation activity plan (CAP). The DWMP documents soil, topographic, and drainage system maps of the site, and identifies the number and location of water control structures that are needed to implement drainage water management according to Field Office Technical Guide standards. The DWMP also provides guidelines for management of the water control structures to achieve desired resource outcomes. The plan is ready for implementation with structural measures and management once the structures are installed. No actual benefits to resource concerns are achieved until the practices in the DWMP are implemented.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,259.83

**Scenario Cost/Unit:** $3,259.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, small surveying crew | 1296 | Conservation Activity Plan labor to perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. Cost associated with this component includes two man field crew, equipment, vehicle, overhead, and miscellaneous supplies. | Hour | $108.19 | 8 | $865.52 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 13 | $996.71 |
| Cap Labor, Survey and Mapping Technician | 1591 | Conservation Activity Plan labor to perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. May verify accuracy and completeness of maps. | Hour | $54.39 | 16 | $870.24 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 16 | $527.36 |

**Practice:** 138 - Conservation Plan Supporting Organic Transition - Written

**Scenario** #14 - Conservation Plan Supporting Organic Transition CAP Crops and Livestock

**Scenario Description:**

Agricultural operation where producer will transition from conventional to organic to meet USDA National Organic Program (NOP) requirements. Natural Resource Concern: Soil Erosion, Water Quality, Plant Condition, and other identified natural resource concerns.

**Before Situation:**

Agricultural operation currently managed using traditional and conventional methods for farming and/or ranching mixed operation of crops and livestock. The producer currently manages operation based upon personal knowledge, or other local criteria. Producer is interested in transitioning part or all of the management unit to meet national USDA requirements for certified operation. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: Refer to the NRCS Plan Criteria for conservation practices associated with operations transitioning to organic certification and typically needed to address identified natural resource concerns.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP to develop the "Conservation Plan Supporting Organic Transition" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement a system of conservation practices which assist the producer to transition from conventional farming or ranching to an organic production system with crops and livestock. The CAP plan will include conservation practices which address related resource concerns. CAP meets the basic quality criteria for the 138 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,750.25

**Scenario Cost/Unit:** $5,750.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 75 | $5,750.25 |

**Practice:** 138 - Conservation Plan Supporting Organic Transition - Written

**Scenario** #15 - Conservation Plan Supporting Organic Transition CAP Crops or Livestock

**Scenario Description:**

Agricultural operation where producer will transition from conventional to organic to meet USDA National Organic Program (NOP) requirements. Natural Resource Concern: Soil Erosion, Water Quality, Plant Condition, and other identified natural resource concerns.

**Before Situation:**

Agricultural operation currently managed using traditional and conventional methods for farming with only crops. The producer currently manages operation based upon personal knowledge, or other local criteria. Producer is interested in transitioning part or all of the management unit to meet national USDA requirements for certified operation. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: Refer to the NRCS Plan Criteria for conservation practices associated with operations transitioning to organic certification and typically needed to address identified natural resource concerns.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP to develop the "Conservation Plan Supporting Organic Transition" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement a system of conservation practices which assist the producer to transition from conventional farming or ranching to an organic production system with crops only. The CAP plan will include conservation practices which address related resource concerns. CAP meets the basic quality criteria for the 138 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,906.88

**Scenario Cost/Unit:** $4,906.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. | Hour | $76.67 | 64 | $4,906.88 |

**Practice:** 142 - Fish and Wildlife Habitat Plan - Written

**Scenario** #8 - Fish and Wildlife Habitat Management CAP

**Scenario Description:**

Various on-farm land uses. Natural Resource Concern: Fish and Wildlife, and other applicable resource concerns on an agricultural operation.

**Before Situation:**

Agricultural currently producer has no plan or knowledge of development or management of fish and/or wildlife habitat. The producer does not currently manage or enhance habitat to promote opportunities for fish and/or habitat. Within existing land uses, producer is interested in management of land or for establishment of new habitat for benefit of appropriate fish or wildlife species. Associated Practices: Applicable conservation practices cited in the CAP criteria and NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Fish and Wildlife Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for the primary fish/wildlife habitat resource concern and other applicable resource concerns and provides for opportunities to improve, restore, or enhance habitat that supports native and/or managed species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 142 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,338.16

**Scenario Cost/Unit:** $3,338.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, biologist | 1298 | Conservation Activity Plan labor to study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management. May collect and analyze biological data to determine the environmental effects of present and potential use of land and water habitats. Cost associated with this component includes overhead and benefits (market price). | Hour | $79.48 | 42 | $3,338.16 |

**Practice:** 142 - Fish and Wildlife Habitat Plan - Written

**Scenario** #26 - Fish & Wildlife Habitat Management CAP (2 Land Uses)

**Scenario Description:**

Various on-farm land uses. Natural Resource Concern: Fish and Wildlife, and other applicable resource concerns on an agricultural operation. CAP addresses fish and wildlife habitat management relative to two land uses on the agricultural operation of which each land use is at least 20 acres in size.

**Before Situation:**

Agricultural currently producer has no plan or knowledge of development or management of fish and/or wildlife habitat. The producer does not currently manage or enhance habitat to promote opportunities for fish and/or habitat. Within existing land uses, producer is interested in management of land or for establishment of new habitat for benefit of appropriate fish or wildlife species. Associated Practices: Applicable conservation practices cited in the CAP criteria and NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Fish and Wildlife Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for the primary fish/wildlife habitat resource concern and other applicable resource concerns and provides for opportunities to improve, restore, or enhance habitat that supports native and/or managed species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 142 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,497.12

**Scenario Cost/Unit:** $3,497.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, biologist | 1298 | Conservation Activity Plan labor to study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management. May collect and analyze biological data to determine the environmental effects of present and potential use of land and water habitats. Cost associated with this component includes overhead and benefits (market price). | Hour | $79.48 | 44 | $3,497.12 |

**Practice:** 142 - Fish and Wildlife Habitat Plan - Written

**Scenario** #42 - Fish & Wildlife Habitat Management CAP (Three Land Uses)

**Scenario Description:**

Various on-farm land uses. Natural Resource Concern: Fish and Wildlife, and other applicable resource concerns on an agricultural operation. CAP addresses fish and wildlife habitat management relative to two or more land uses on the agricultural operation of which at least three of the land uses are at least 20 acres in size

**Before Situation:**

Agricultural currently producer has no plan or knowledge of development or management of fish and/or wildlife habitat. The producer does not currently manage or enhance habitat to promote opportunities for fish and/or habitat. Within existing land uses, producer is interested in management of land or for establishment of new habitat for benefit of appropriate fish or wildlife species. Associated Practices: Applicable conservation practices cited in the CAP criteria and NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Fish and Wildlife Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for the primary fish/wildlife habitat resource concern and other applicable resource concerns and provides for opportunities to improve, restore, or enhance habitat that supports native and/or managed species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 142 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,132.96

**Scenario Cost/Unit:** $4,132.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, biologist | 1298 | Conservation Activity Plan labor to study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management. May collect and analyze biological data to determine the environmental effects of present and potential use of land and water habitats. Cost associated with this component includes overhead and benefits (market price). | Hour | $79.48 | 52 | $4,132.96 |

**Practice:** 142 - Fish and Wildlife Habitat Plan - Written

**Scenario** #58 - Fish & Wildlife Habitat Management CAP (1 Land Use)

**Scenario Description:**

Various on-farm land uses. Natural Resource Concern: Fish and Wildlife, and other applicable resource concerns on an agricultural operation. CAP addresses fish and wildlife habitat management relative to only one land use on the agricultural operation.

**Before Situation:**

Agricultural currently producer has no plan or knowledge of development or management of fish and/or wildlife habitat. The producer does not currently manage or enhance habitat to promote opportunities for fish and/or habitat. Within existing land uses, producer is interested in management of land or for establishment of new habitat for benefit of appropriate fish or wildlife species. Associated Practices: Applicable conservation practices cited in the CAP criteria and NRCS Field Office Technical Guide.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Fish and Wildlife Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for the primary fish/wildlife habitat resource concern and other applicable resource concerns and provides for opportunities to improve, restore, or enhance habitat that supports native and/or managed species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 142 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,861.28

**Scenario Cost/Unit:** $2,861.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, biologist | 1298 | Conservation Activity Plan labor to study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management. May collect and analyze biological data to determine the environmental effects of present and potential use of land and water habitats. Cost associated with this component includes overhead and benefits (market price). | Hour | $79.48 | 36 | $2,861.28 |

**Practice:** 146 - Pollinator Habitat Plan - Written

**Scenario** #14 - Pollinator Habitat Enhancement Plan CAP

**Scenario Description:**

Various on-farm land uses. Natural Resource Concern: Fish and Wildlife, Plant Condition, Soil Erosion, Water Quality on an agricultural operation.

**Before Situation:**

Agricultural producer currently has no plan or knowledge of development or management of pollinator habitat. The producer does not currently manage or enhance habitat to promote opportunities for pollinator habitat. Within existing land uses, producer may be interested in management of land or for establishment of new habitat for benefit of appropriate pollinator species. Associated Practices: 311, 322, 327, 328, 656, 332, 340, 342, 647, 386, 393, 412, 422, 603, 379, 512, 595, 338, 528, 550, 329, 643, 391, 390, 381, 395, 580, 585, 612, 645, 601, 659, 657, 644, 380, 650.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Pollinator Habitat Enhancement" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to improve, restore, or enhance flower-rich habitat that supports native and/or managed pollinator species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 146 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,338.16

**Scenario Cost/Unit:** $3,338.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, biologist | 1298 | Conservation Activity Plan labor to study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management. May collect and analyze biological data to determine the environmental effects of present and potential use of land and water habitats. Cost associated with this component includes overhead and benefits (market price). | Hour | $79.48 | 42 | $3,338.16 |

**Practice:** 146 - Pollinator Habitat Plan - Written

**Scenario** #15 - Pollinator Habitat Enhancement Plan CAP - No Local TSP

**Scenario Description:**

Various on-farm land uses, No qualified TSP within 300 miles. Natural Resource Concern: Fish and Wildlife, Plant Condition, Soil Erosion, Water Quality on an agricultural operation.

**Before Situation:**

Agricultural producer currently has no plan or knowledge of development or management of pollinator habitat. The producer does not currently manage or enhance habitat to promote opportunities for pollinator habitat. Within existing land uses, producer may be interested in management of land or for establishment of new habitat for benefit of appropriate pollinator species. Associated Practices: 311, 322, 327, 328, 656, 332, 340, 342, 647, 386, 393, 412, 422, 603, 379, 512, 595, 338, 528, 550, 329, 643, 391, 390, 381, 395, 580, 585, 612, 645, 601, 659, 657, 644, 380, 650.

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for develop of the "Pollinator Habitat Enhancement" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to improve, restore, or enhance flower-rich habitat that supports native and/or managed pollinator species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 146 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,848.28

**Scenario Cost/Unit:** $4,848.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, biologist | 1298 | Conservation Activity Plan labor to study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management. May collect and analyze biological data to determine the environmental effects of present and potential use of land and water habitats. Cost associated with this component includes overhead and benefits (market price). | Hour | $79.48 | 61 | $4,848.28 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #72 - Data Collect Surface Year 1-QAPP

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and one treatment site with an average of 20 samples per year per station. The scenario requires the creation of a survey to site a monitoring station, preparation of monitoring plan and a quality assurance project plan to detail how data will be collected, handled and analyzed, provides for the data collection, analysis, semiannual report, and annual report. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP need to be prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will not have a plan or quality assurance project plan prepared for installing equipment nor collecting data for sediment and nutrients leaving the edge of field.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring Sites

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $22,418.92

**Scenario Cost/Unit:** $22,418.92

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 100 | $7,850.00 |
| CAP Labor, small surveying crew | 1296 | Conservation Activity Plan labor to perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. Cost associated with this component includes two man field crew, equipment, vehicle, overhead, and miscellaneous supplies. | Hour | $108.19 | 16 | $1,731.04 |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 20 | $1,838.20 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 130 | $4,284.80 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 4 | $110.08 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |

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|---|---|---|---|---|---|---|
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 20 | $550.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 20 | $550.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #73 - Data Collect Surface Year 1 - NO QAPP

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and one treatment site. The scenario requires the collection and analysis of edge-of-field water quality data with an average sample collection of 20 per year for surface systems. The data will be transferred through semi-annual submittal and annual report which include some preliminary annual analysis. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP will be not prepared as this is for an existing monitoring system that has been accepted as meeting both Activity 201 and 202. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared as part of an existing monitoring system installation where the QAPP and monitoring plan meets Activity 201 requirements and no major changes are needed to meet Activity 202 requirements. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $15,709.68

**Scenario Cost/Unit:** $15,709.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 60 | $4,710.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 130 | $4,284.80 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 4 | $110.08 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 20 | $550.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 20 | $550.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |

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|---|---|---|---|---|---|---|
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #74 - Data Collect Surface Year 2+

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and one treatment site. The scenario requires the collection and analysis of edge-of-field water quality data with an average sample collection of 20 per year for surface systems. The data will be transferred through semi-annual submittal and annual report which include some preliminary annual analysis. This scenario will normally be used in year 2 to next to the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $15,709.68

**Scenario Cost/Unit:** $15,709.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 60 | $4,710.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 130 | $4,284.80 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 4 | $110.08 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 20 | $550.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 20 | $550.40 |

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| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #75 - Data Collect Surface Year 2+

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and one treatment site. The scenario requires the collection and analysis of edge-of-field water quality data with an average sample collection of 20 per year for surface systems. The data will be transferred through semi-annual submittal and annual report which include some preliminary annual analysis. This scenario will normally be used in year 2 to next to the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $15,709.68

**Scenario Cost/Unit:** $15,709.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 60 | $4,710.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 130 | $4,284.80 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 4 | $110.08 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 20 | $550.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |

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| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 20 | $550.40 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #76 - Data Collect Surface Last Year

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and one treatment site with an average of 20 samples per year per station. The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submittal and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201 to provide a comprehensive report of statistical testing of data collected to complete monitoring period.

**Feature Measure:** Measuring Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $18,849.68

**Scenario Cost/Unit:** $18,849.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 100 | $7,850.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 130 | $4,284.80 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 4 | $110.08 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 20 | $550.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 20 | $550.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |

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|---|---|---|---|---|---|---|
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 40 | $1,100.80 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #77 - Data Collect Tile Year 1-QAPP

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and one treatment site with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The scenario requires the creation of a survey to site a monitoring station, preparation of monitoring plan and a quality assurance project plan to detail how data will be collected, handled and analyzed, provides for the data collection, analysis, semiannual report, and annual report. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP need to be prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will not have a plan or quality assurance project plan prepared for installing equipment nor collecting data for sediment and nutrients leaving the edge of field.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $44,202.40

**Scenario Cost/Unit:** $44,202.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 130 | $10,205.00 |
| CAP Labor, small surveying crew | 1296 | Conservation Activity Plan labor to perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. Cost associated with this component includes two man field crew, equipment, vehicle, overhead, and miscellaneous supplies. | Hour | $108.19 | 16 | $1,731.04 |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 20 | $1,838.20 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 312 | $10,283.52 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 12 | $330.24 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |

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|---|---|---|---|---|---|---|
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #78 - Data Collect Tile Year 1 - NO QAPP

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and one treatment site with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The data will be transferred through semi-annual submittal and annual reports, which include some preliminary annual analysis. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP will be not prepared as this is for an existing monitoring system be accepted as meeting both Activity 201 and 202. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared as part of an existing monitoring system installation where the QAPP and monitoring plan meets Activity 201 requirements and no major changes are needed to meet Activity 202 requirements. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $37,493.16

**Scenario Cost/Unit:** $37,493.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 90 | $7,065.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 312 | $10,283.52 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 12 | $330.24 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |

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|---|---|---|---|---|---|---|
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #79 - Data Collect Tile Last Year

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and one treatment site with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submittal and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201 to provide a comprehensive report of statistical testing of data collected during to complete monitoring period.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $40,633.16

**Scenario Cost/Unit:** $40,633.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 130 | $10,205.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 312 | $10,283.52 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 12 | $330.24 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |

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| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #80 - Data Collect Tile Year 2+

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and one treatment site with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The data will be transferred through semi-annual submittal and annual report, which include some preliminary annual analysis. This scenario will normally be used in year 2 to next to the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will not have a plan or quality assurance project plan prepared for installing equipment nor collecting data for sediment and nutrients leaving the edge of field.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and one treatment site. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $37,493.16

**Scenario Cost/Unit:** $37,493.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 90 | $7,065.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 312 | $10,283.52 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 12 | $330.24 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |

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| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 120 | $3,302.40 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #81 - Data Collect Surface Year 1-QAPP with two treatment Sites

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and two treatment sites with an average of 20 samples per year per station. The scenario requires the creation of a survey to site a monitoring station, preparation of monitoring plan and a quality assurance project plan to detail how data will be collected, handled and analyzed, provides for the data collection, analysis, semiannual report, and annual report. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP need to be prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will not have a plan or quality assurance project plan prepared for installing equipment nor collecting data for sediment and nutrients leaving the edge of field.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring Sites

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $30,772.94

**Scenario Cost/Unit:** $30,772.94

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 130 | $10,205.00 |
| CAP Labor, small surveying crew | 1296 | Conservation Activity Plan labor to perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. Cost associated with this component includes two man field crew, equipment, vehicle, overhead, and miscellaneous supplies. | Hour | $108.19 | 24 | $2,596.56 |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 30 | $2,757.30 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 156 | $5,141.76 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 6 | $165.12 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |

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|---|---|---|---|---|---|---|
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 30 | $825.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 30 | $825.60 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #82 - Data Collect Surface Year 1 less QAPP (pre-install information) with two treatment sites

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and two treatment sites. The scenario requires the collection and analysis of edge-of-field water quality data with an average sample collection of 20 per year for each surface system. The data will be transferred through semi-annual submittal and annual report, which include some preliminary annual analysis. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP will not be prepared as this is for an existing monitoring system be accepted as meeting both Activity 201 and 202. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared as part of an existing monitoring system installation where the QAPP and monitoring plan meets Activity 201 requirements and no major changes are needed to meet Activity 202 requirements. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $22,279.08

**Scenario Cost/Unit:** $22,279.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 90 | $7,065.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 156 | $5,141.76 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 6 | $165.12 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 30 | $825.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 30 | $825.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |

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| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #83 - Data Collect Surface Year 2+ with two treatment sites

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and two treatment sites. The scenario requires the collection and analysis of edge-of-field water quality data with an average sample collection of 20 per year for each surface system. The data will be transferred through semi-annual submittal and annual report, which include some preliminary annual analysis. This scenario will normally be used in year 2 to next to the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $22,279.08

**Scenario Cost/Unit:** $22,279.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 90 | $7,065.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 156 | $5,141.76 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 6 | $165.12 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 30 | $825.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 30 | $825.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |

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| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #84 - Data Collect Surface Last Year with two treatment sites

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and two treatment sites with an average of 20 samples per year per station. The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submittal and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201 to provide a comprehensive report of statistical testing of data collected during to complete monitoring period.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $26,989.08

**Scenario Cost/Unit:** $26,989.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 150 | $11,775.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 156 | $5,141.76 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 6 | $165.12 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 30 | $825.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 30 | $825.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |

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| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 60 | $1,651.20 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #85 - Data Collect Tile Year 1 less QAPP (pre-install information) with two treatment sites

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and two treatment sites with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The data will be transferred through semi-annual submittal and annual reports, which include some preliminary annual analysis. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP will not be prepared as this is for an existing monitoring system be accepted as meeting both Activity 201 and 202. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared as part of an existing monitoring system installation where the QAPP and monitoring plan meets Activity 201 requirements and no major changes are needed to meet Activity 202 requirements. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $52,811.90

**Scenario Cost/Unit:** $52,811.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 135 | $10,597.50 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 364 | $11,997.44 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 18 | $495.36 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 90 | $2,476.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 90 | $2,476.80 |

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| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #86 - Data Collect Tile Year 2+ with two treatment sites

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and two treatment sites with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The data will be transferred through semi-annual submittal and annual report, which include some preliminary annual analysis. This scenario will normally be used in year 2 to next to the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and two treatment sites. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $52,811.90

**Scenario Cost/Unit:** $52,811.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 135 | $10,597.50 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 364 | $11,997.44 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 18 | $495.36 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 90 | $2,476.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 90 | $2,476.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |

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| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoring-Data Collection and Evaluation

**Scenario** #87 - Data Collect Tile Last Year with two treatment sites

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and two treatment sites with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submittal and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201 to provide a comprehensive report of statistical testing of data collected during to complete monitoring period.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $57,521.90

**Scenario Cost/Unit:** $57,521.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 195 | $15,307.50 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 364 | $11,997.44 |
| **Materials** | | | | | | |
| Testing, Blanks Samples | 2612 | Blanks or Duplicate Samples; Includes materials only. | Each | $27.52 | 18 | $495.36 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 90 | $2,476.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 90 | $2,476.80 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |

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|---|---|---|---|---|---|---|
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |
| Testing, Water Quality | 2613 | Ammonium, Nitrite plus Nitrate, Total Kjeldahl Nitrogen, Soluble Reactive P (Orthophosphate), Total Phosphorus, Suspended Sediment Concentration – Preferred, or Total Suspended Solids. Includes materials only. | Each | $27.52 | 180 | $4,953.60 |

**Practice:** 202 - Edge-of-Field Water Quality Monitoring-System Installation

**Scenario** #60 - System Installation-Surface

**Scenario Description:**

This edge-of-field water quality monitoring system is applicable to a single control or treatment site that has a field defined with surface runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for southern latitudes where winter time heating is not required for sampling. It will allow for installation of automated sampling data collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, and a berm or other directional flow structure to guide the runoff to a sampling flume.

**Before Situation:**

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $19,624.10

**Scenario Cost/Unit:** $19,624.10

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 5 | $392.50 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 60 | $1,977.60 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.12 | $1,016.88 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |
| Automated sampler with bottles and tubing | 2606 | Equipment used to collect the water samples on a flow weighted interval of 1.27 mm of runoff (volumetric depth) during a storm event. | Each | $2,413.21 | 1 | $2,413.21 |
| Connectors, cables, platform materials | 2607 | Miscellaneous (connectors, cables, berm, platform materials); Includes materials only. | Each | $2,201.83 | 1 | $2,201.83 |
| Depth (stage) sensor | 2608 | Device used to relay information to the Data logger about incremental increases in runoff. ISCO 730 Module with 1/8-in x 25-ft vinyl bubble line. Includes equipment only. Used for A202 water quality monitering | Each | $3,067.71 | 1 | $3,067.71 |
| Equipment shelter | 2609 | Building designed to house and reduce the risk of equipment damage from weather, animals, and vandalism. | Each | $774.22 | 1 | $774.22 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pre-calibrated flow control structure-surface | 2610 | Pre-calibrated flow control structure-surface. Used for A202 water quality monitering | Each | $3,619.46 | 1 | $3,619.46 |
| Device, communications | 2616 | Piece of equipment or hardware designed to transmit real time data or information collected prior to site visits. Includes equipment only. | Each | $2,599.93 | 1 | $2,599.93 |

**Practice:** 202 - Edge-of-Field Water Quality Monitoring-System Installation

**Scenario** #61 - System Installation-Surface Cold Climate

**Scenario Description:**

This edge-of-field water quality monitoring system is applicable to a single control or treatment site that has a field defined with surface runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for northern latitudes where winter time heating is required for sampling. It will allow for installation of automated sampling data collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, a calf hut or other structure with heat is required over the flume to allow sampling under northern latitude winter conditions, and a berm or other directional flow structure to guide the runoff to a sampling flume.

**Before Situation:**

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients. Nothing is known about the volume or mass of sediment and nutrients leaving the edge of field through the tile or other subsurface drainage system.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $21,050.55

**Scenario Cost/Unit:** $21,050.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 5 | $392.50 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 60 | $1,977.60 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.12 | $1,016.88 |
| Heater, high efficiency | 1165 | Natural gas, propane, or fuel oil unit heater or boiler and venting materials. Based on input kBTU/hour. Includes materials and shipping only. | 1,000 BTU/Hour | $12.45 | 1 | $12.45 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |
| Automated sampler with bottles and tubing | 2606 | Equipment used to collect the water samples on a flow weighted interval of 1.27 mm of runoff (volumetric depth) during a storm event. | Each | $2,413.21 | 1 | $2,413.21 |
| Connectors, cables, platform materials | 2607 | Miscellaneous (connectors, cables, berm, platform materials); Includes materials only. | Each | $2,201.83 | 1 | $2,201.83 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Depth (stage) sensor | 2608 | Device used to relay information to the Data logger about incremental increases in runoff. ISCO 730 Module with 1/8-in x 25-ft vinyl bubble line. Includes equipment only. Used for A202 water quality monitering | Each | $3,067.71 | 1 | $3,067.71 |
| Equipment shelter | 2609 | Building designed to house and reduce the risk of equipment damage from weather, animals, and vandalism. | Each | $774.22 | 1 | $774.22 |
| Pre-calibrated flow control structure-surface | 2610 | Pre-calibrated flow control structure-surface. Used for A202 water quality monitering | Each | $3,619.46 | 1 | $3,619.46 |
| Device, communications | 2616 | Piece of equipment or hardware designed to transmit real time data or information collected prior to site visits. Includes equipment only. | Each | $2,599.93 | 1 | $2,599.93 |
| Equipment Shed | 2617 | Equipment Shed (10' x 10') made of steel applied over the sampling flume to allow collection of water samples during the winter in colder climates. | Each | $1,414.00 | 1 | $1,414.00 |

**Practice:** 202 - Edge-of-Field Water Quality Monitoring-System Installation

**Scenario** #62 - System Installation-Tile

**Scenario Description:**

This edge-of-field water quality monitoring system is applicable to a single control or treatment site that has a field defined with tile or other subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for southern latitudes where winter time heating is not required for sampling. It will allow for installation of automated sampling data collection system for a subsurface collection and separate surface automated sample collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, an area velocity sensor for pipe flow and estimation of submerged flow, and a berm or other directional flow structure to guide the runoff to a sampling flume.

**Before Situation:**

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients. Nothing is known about the volume or mass of sediment and nutrients leaving the edge of field through the tile or other subsurface drainage system.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $30,353.97

**Scenario Cost/Unit:** $30,353.97

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 6 | $471.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 100 | $3,296.00 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.12 | $1,016.88 |
| Heater, high efficiency | 1165 | Natural gas, propane, or fuel oil unit heater or boiler and venting materials. Based on input kBTU/hour. Includes materials and shipping only. | 1,000 BTU/Hour | $12.45 | 1 | $12.45 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |
| Automated sampler with bottles and tubing | 2606 | Equipment used to collect the water samples on a flow weighted interval of 1.27 mm of runoff (volumetric depth) during a storm event. | Each | $2,413.21 | 2 | $4,826.42 |
| Connectors, cables, platform materials | 2607 | Miscellaneous (connectors, cables, berm, platform materials); Includes materials only. | Each | $2,201.83 | 1 | $2,201.83 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Depth (stage) sensor | 2608 | Device used to relay information to the Data logger about incremental increases in runoff. ISCO 730 Module with 1/8-in x 25-ft vinyl bubble line. Includes equipment only. Used for A202 water quality monitering | Each | $3,067.71 | 2 | $6,135.42 |
| Equipment shelter | 2609 | Building designed to house and reduce the risk of equipment damage from weather, animals, and vandalism. | Each | $774.22 | 2 | $1,548.44 |
| Pre-calibrated flow control structure-surface | 2610 | Pre-calibrated flow control structure-surface. Used for A202 water quality monitering | Each | $3,619.46 | 1 | $3,619.46 |
| Pre-calibrated flow control structure-subsurface (pipe flow) | 2615 | Equipment used to collect runoff for ease in measure of flow, sample collection and to reduce time in constructing and calibrating of a flow structure. | Each | $1,651.38 | 1 | $1,651.38 |
| Device, communications | 2616 | Piece of equipment or hardware designed to transmit real time data or information collected prior to site visits. Includes equipment only. | Each | $2,599.93 | 1 | $2,599.93 |
| Equipment Shed | 2617 | Equipment Shed (10' x 10') made of steel applied over the sampling flume to allow collection of water samples during the winter in colder climates. | Each | $1,414.00 | 1 | $1,414.00 |

**Practice:** 202 - Edge-of-Field Water Quality Monitoring-System Installation

**Scenario** #63 - System Installation-Tile Cold Climate

**Scenario Description:**

This edge-of-field water quality monitoring system is applicable to a single control or treatment site that has a field defined with tile or other subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for northern latitudes where winter time heating is required for sampling. It will allow for installation of automated sampling data collection system for a subsurface collection and separate surface automated sample collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, an area velocity sensor for pipe flow and estimation of submerged flow, a calf hut or other structure with heat is required over the flume to allow sampling under northern latitude winter conditions and a berm or other directional flow structure to guide the runoff to a sampling flume.

**Before Situation:**

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients. Nothing is known about the volume or mass of sediment and nutrients leaving the edge of field through the tile or other subsurface drainage system.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $30,353.97

**Scenario Cost/Unit:** $30,353.97

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 6 | $471.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 100 | $3,296.00 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.12 | $1,016.88 |
| Heater, high efficiency | 1165 | Natural gas, propane, or fuel oil unit heater or boiler and venting materials. Based on input kBTU/hour. Includes materials and shipping only. | 1,000 BTU/Hour | $12.45 | 1 | $12.45 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |
| Automated sampler with bottles and tubing | 2606 | Equipment used to collect the water samples on a flow weighted interval of 1.27 mm of runoff (volumetric depth) during a storm event. | Each | $2,413.21 | 2 | $4,826.42 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Connectors, cables, platform materials | 2607 | Miscellaneous (connectors, cables, berm, platform materials); Includes materials only. | Each | $2,201.83 | 1 | $2,201.83 |
| Depth (stage) sensor | 2608 | Device used to relay information to the Data logger about incremental increases in runoff. ISCO 730 Module with 1/8-in x 25-ft vinyl bubble line. Includes equipment only. Used for A202 water quality monitering | Each | $3,067.71 | 2 | $6,135.42 |
| Equipment shelter | 2609 | Building designed to house and reduce the risk of equipment damage from weather, animals, and vandalism. | Each | $774.22 | 2 | $1,548.44 |
| Pre-calibrated flow control structure-surface | 2610 | Pre-calibrated flow control structure-surface. Used for A202 water quality monitering | Each | $3,619.46 | 1 | $3,619.46 |
| Pre-calibrated flow control structure-subsurface (pipe flow) | 2615 | Equipment used to collect runoff for ease in measure of flow, sample collection and to reduce time in constructing and calibrating of a flow structure. | Each | $1,651.38 | 1 | $1,651.38 |
| Device, communications | 2616 | Piece of equipment or hardware designed to transmit real time data or information collected prior to site visits. Includes equipment only. | Each | $2,599.93 | 1 | $2,599.93 |
| Equipment Shed | 2617 | Equipment Shed (10' x 10') made of steel applied over the sampling flume to allow collection of water samples during the winter in colder climates. | Each | $1,414.00 | 1 | $1,414.00 |

**Practice:** 202 - Edge-of-Field Water Quality Monitoring-System Installation

**Scenario** #64 - System Installation-Above And Below

**Scenario Description:**

This edge-of-field water quality monitoring system is applicable where a conservation practice has a pre- and post treatment area in the same field drainage with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for southern latitudes where winter time heating is not required for sampling. It will allow for installation of automated sampling data collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, and a berm or other directional flow structure to guide the runoff to a sampling flume. The actual installation will different on the subsurface flow by allowing a smaller precalibrated flume with the addition of a velocity sensor meter as in the tile alternative.

**Before Situation:**

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $29,577.20

**Scenario Cost/Unit:** $29,577.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 6 | $471.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 60 | $1,977.60 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.12 | $1,016.88 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |
| Automated sampler with bottles and tubing | 2606 | Equipment used to collect the water samples on a flow weighted interval of 1.27 mm of runoff (volumetric depth) during a storm event. | Each | $2,413.21 | 2 | $4,826.42 |
| Connectors, cables, platform materials | 2607 | Miscellaneous (connectors, cables, berm, platform materials); Includes materials only. | Each | $2,201.83 | 1 | $2,201.83 |
| Depth (stage) sensor | 2608 | Device used to relay information to the Data logger about incremental increases in runoff. ISCO 730 Module with 1/8-in x 25-ft vinyl bubble line. Includes equipment only. Used for A202 water quality monitering | Each | $3,067.71 | 2 | $6,135.42 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Equipment shelter | 2609 | Building designed to house and reduce the risk of equipment damage from weather, animals, and vandalism. | Each | $774.22 | 2 | $1,548.44 |
| Pre-calibrated flow control structure-surface | 2610 | Pre-calibrated flow control structure-surface. Used for A202 water quality monitering | Each | $3,619.46 | 2 | $7,238.92 |
| Device, communications | 2616 | Piece of equipment or hardware designed to transmit real time data or information collected prior to site visits. Includes equipment only. | Each | $2,599.93 | 1 | $2,599.93 |

**Practice:** 202 - Edge-of-Field Water Quality Monitoring-System Installation

**Scenario** #65 - System Installation-Above And Below cold climate

**Scenario Description:**

This edge-of-field water quality monitoring system is applicable where a conservation practice has a pre- and post treatment area in the same field drainage with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for northern latitudes where winter time heating is required for sampling. It will allow for installation of automated sampling data collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, a calf hut or other structure with heat is required over the flume to allow sampling under northern latitude winter conditions, and a berm or other directional flow structure to guide the runoff to a sampling flume. The actual installation will different on the subsurface flow by allowing a smaller pre-calibrated flume with the addition of a velocity sensor meter as in the tile alternative.

**Before Situation:**

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients. Nothing is known about the volume or mass of sediment and nutrients leaving the edge of field through the tile or other subsurface drainage system.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $35,030.03

**Scenario Cost/Unit:** $35,030.03

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 6 | $471.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 60 | $1,977.60 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.12 | $1,016.88 |
| Heater, high efficiency | 1165 | Natural gas, propane, or fuel oil unit heater or boiler and venting materials. Based on input kBTU/hour. Includes materials and shipping only. | 1,000 BTU/Hour | $12.45 | 2 | $24.90 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |
| Automated sampler with bottles and tubing | 2606 | Equipment used to collect the water samples on a flow weighted interval of 1.27 mm of runoff (volumetric depth) during a storm event. | Each | $2,413.21 | 2 | $4,826.42 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Connectors, cables, platform materials | 2607 | Miscellaneous (connectors, cables, berm, platform materials); Includes materials only. | Each | $2,201.83 | 1 | $2,201.83 |
| Depth (stage) sensor | 2608 | Device used to relay information to the Data logger about incremental increases in runoff. ISCO 730 Module with 1/8-in x 25-ft vinyl bubble line. Includes equipment only. Used for A202 water quality monitering | Each | $3,067.71 | 2 | $6,135.42 |
| Equipment shelter | 2609 | Building designed to house and reduce the risk of equipment damage from weather, animals, and vandalism. | Each | $774.22 | 2 | $1,548.44 |
| Pre-calibrated flow control structure-surface | 2610 | Pre-calibrated flow control structure-surface. Used for A202 water quality monitering | Each | $3,619.46 | 2 | $7,238.92 |
| Device, communications | 2616 | Piece of equipment or hardware designed to transmit real time data or information collected prior to site visits. Includes equipment only. | Each | $2,599.93 | 2 | $5,199.86 |
| Equipment Shed | 2617 | Equipment Shed (10' x 10') made of steel applied over the sampling flume to allow collection of water samples during the winter in colder climates. | Each | $1,414.00 | 2 | $2,828.00 |

**Practice:** 202 - Edge-of-Field Water Quality Monitoring-System Installation

**Scenario** #66 - System Installation-Retrofit 1

**Scenario Description:**

This edge-of-field water quality monitoring system is to retrofit an existing system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to a single control or treatment site that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge and back-up/solar power supply be added to existing system. It is actually to represent a cost for any system updates that has component costs of $2,400 or less as per the component costs in various scenarios.

**Before Situation:**

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,497.50

**Scenario Cost/Unit:** $3,497.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 5 | $392.50 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 16 | $527.36 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.12 | $1,016.88 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |

**Practice:** 202 - Edge-of-Field Water Quality Monitoring-System Installation

**Scenario** #67 - System Installation-Retrofit 2

**Scenario Description:**

This edge-of-field water quality monitoring system is to retrofit an existing system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to a single control or treatment site that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge, back-up/solar power supply, communications device, and depth (stage) sensor to be added to existing system. It is actually to represent a cost for any system updates that has component costs greater than $2,400 but less than or equal to $7,300 as per the component costs in various scenarios.

**Before Situation:**

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $9,296.98

**Scenario Cost/Unit:** $9,296.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 5 | $392.50 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 20 | $659.20 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.12 | $1,016.88 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |
| Depth (stage) sensor | 2608 | Device used to relay information to the Data logger about incremental increases in runoff. ISCO 730 Module with 1/8-in x 25-ft vinyl bubble line. Includes equipment only. Used for A202 water quality monitering | Each | $3,067.71 | 1 | $3,067.71 |
| Device, communications | 2616 | Piece of equipment or hardware designed to transmit real time data or information collected prior to site visits. Includes equipment only. | Each | $2,599.93 | 1 | $2,599.93 |

**Practice:** 202 - Edge-of-Field Water Quality Monitoring-System Installation

**Scenario** #68 - System Installation-Retrofit 3

**Scenario Description:**

This edge-of-field water quality monitoring system is to retrofit an existing system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to a single control or treatment site that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge, back-up/solar power supply, communications device, pre-calibrated flow control structure, and depth (stage) sensor to be added to existing system. It is actually to represent a cost for any system updates that has component costs greater than $7,300 but less than or equal to $10,500 as per the component costs in various scenarios. Anything above $10,500 will evaluated as a full system replacement as per scenarios for surface or tile (subsurface) drainage.

**Before Situation:**

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $13,311.96

**Scenario Cost/Unit:** $13,311.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 5 | $392.50 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 32 | $1,054.72 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.12 | $1,016.88 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |
| Depth (stage) sensor | 2608 | Device used to relay information to the Data logger about incremental increases in runoff. ISCO 730 Module with 1/8-in x 25-ft vinyl bubble line. Includes equipment only. Used for A202 water quality monitering | Each | $3,067.71 | 1 | $3,067.71 |
| Pre-calibrated flow control structure-surface | 2610 | Pre-calibrated flow control structure-surface. Used for A202 water quality monitering | Each | $3,619.46 | 1 | $3,619.46 |
| Device, communications | 2616 | Piece of equipment or hardware designed to transmit real time data or information collected prior to site visits. Includes equipment only. | Each | $2,599.93 | 1 | $2,599.93 |

**Practice:** 202 - Edge-of-Field Water Quality Monitoring-System Installation

**Scenario** #69 - System Installation-Retrofit Above and Below 1

**Scenario Description:**

This edge-of-field water quality monitoring system is to retrofit an existing above and below monitoring designed system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to an above and below system that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge and two back-up/solar power supply be added to existing paired system. It is actually to represent a cost for any system updates that has component costs of $3,300 or less as per the component costs in various scenarios.

**Before Situation:**

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,041.75

**Scenario Cost/Unit:** $5,041.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 5 | $392.50 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 32 | $1,054.72 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.24 | $2,033.77 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |

**Practice:** 202 - Edge-of-Field Water Quality Monitoring-System Installation

**Scenario** #70 - System Installation-Retrofit Above 2

**Scenario Description:**

This edge-of-field water quality monitoring system is to retrofit an existing above and below monitoring designed system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to an above and below system that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge, two back-up/solar power supplies, two communications devices, and two depth (stage) sensors to be added to existing paired system. It is actually to represent a cost for any system updates that has component costs greater than $3,300 but less than or equal to $13,200 as per the component costs in various scenarios.

**Before Situation:**

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $16,455.53

**Scenario Cost/Unit:** $16,455.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 6 | $471.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 32 | $1,054.72 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.24 | $2,033.77 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |
| Depth (stage) sensor | 2608 | Device used to relay information to the Data logger about incremental increases in runoff. ISCO 730 Module with 1/8-in x 25-ft vinyl bubble line. Includes equipment only. Used for A202 water quality monitering | Each | $3,067.71 | 2 | $6,135.42 |
| Device, communications | 2616 | Piece of equipment or hardware designed to transmit real time data or information collected prior to site visits. Includes equipment only. | Each | $2,599.93 | 2 | $5,199.86 |

**Practice:** 202 - Edge-of-Field Water Quality Monitoring-System Installation

**Scenario** #71 - System Installation-Retrofit Above 3

**Scenario Description:**

This edge-of-field water quality monitoring system is to retrofit an existing above and below monitoring designed system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to an above and below system that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge, two back-up/solar power supplies, two communications devices, two pre-calibrated flumes, and two depth (stage) sensors to be added to existing paired system. It is actually to represent a cost for any system updates that has component costs greater than $13,500 but less than or equal to $20,500 as per the component costs in various scenarios. Anything above a $20,500 will evaluated as a full system replacement as per scenarios for surface or tile (subsurface) drainage.

**Before Situation:**

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $23,958.13

**Scenario Cost/Unit:** $23,958.13

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, agronomist | 1295 | Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner. | Hour | $78.50 | 6 | $471.00 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 40 | $1,318.40 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.24 | $2,033.77 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |
| Depth (stage) sensor | 2608 | Device used to relay information to the Data logger about incremental increases in runoff. ISCO 730 Module with 1/8-in x 25-ft vinyl bubble line. Includes equipment only. Used for A202 water quality monitering | Each | $3,067.71 | 2 | $6,135.42 |
| Pre-calibrated flow control structure-surface | 2610 | Pre-calibrated flow control structure-surface. Used for A202 water quality monitering | Each | $3,619.46 | 2 | $7,238.92 |
| Device, communications | 2616 | Piece of equipment or hardware designed to transmit real time data or information collected prior to site visits. Includes equipment only. | Each | $2,599.93 | 2 | $5,199.86 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #1 - Enclosed building for storage and handling

**Scenario Description:**

This practice scenario is an agrichemical handling facility for storage and mixing and loading operations. This practice addresses water quality degradation and due to mishandling, storing and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Access Road (560), Pipeline (516), Roof Runoff Management (558), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595)

**Before Situation:**

Agrichemicals are improperly stored on the ground or next to a well. Operator mixes the agrichemicals and fills the sprayer tank next to a hydrant. Spills or overflows of agrichemicals contaminate the soil, runoff to surface waters and leaching to ground water.

**After Situation:**

An agrichemical storage and handling facility is constructed inside an enclosed building. The average size of the agrichemical handling facility for storage, mixing, and loading is 35' x 40' and serves application equipment with a length of 36 ft. The pad (slab) for mixing and loading operations is sized to hold the agrichemical spray tank and its volume. A reinforced concrete curb surrounds the pad on three sides, and the fourth side has a ramp. The concrete is sealed and sloped to a collection sump (a precast catch basin located at the lowest point of the slab). This practice will contain agrichemicals and prevent contamination of surface and ground water resources. The building is made of metal to avoid building code requirements for an automatic sprinkler system pertinent to wood structures. For worker safety and building code requirements, an eye wash station, a safety cabinet for chemical storage, and two metal door exits are included. Ventilation is also required by building code, thus a ventilation fan is installed.

**Feature Measure:** Total Containment Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1,400.0

**Scenario Total Cost:** $47,428.30

**Scenario Cost/Unit:** $33.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 22 | $6,181.34 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 13 | $5,680.87 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 25 | $109.25 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 8 | $519.36 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 24 | $681.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 26 | $730.86 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $588.77 | 1 | $588.77 |
| Painting, concrete surface, impermeable | 1497 | Painting of concrete surfaces with an impermeable coating. Includes materials and application. | Square Foot | $1.06 | 1400 | $1,484.00 |
| Emergency shower and eye wash station | 1499 | Emergency shower and ewe wash station unit. Materials only. | Each | $603.40 | 1 | $603.40 |
| Roof, Steel Frame Monoslope Building, 30' to 60' wide | 1681 | Steel Frame Monoslope Building, 30' to 60' width, includes materials, equipment, and installation. Does not include foundation preparation. | Square Foot | $9.85 | 1400 | $13,790.00 |
| Tank, rinsate or chemical storage, > 100 to 300 gal | 2050 | Poly tank reservoir for storing rinsate or other liquid agrichemicals. Greater than 100 to 300 gallon capacity. Materials only. | Gallon | $1.46 | 600 | $876.00 |
| Wall, Exterior, Metal | 2305 | Exterior wall, 2" x 4" studs on 24" center, 30 gauge galvanized steel sheeting, and one pre-hung door. Includes materials, equipment and labor. | Foot | $79.82 | 150 | $11,973.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Fan, exhaust, 18" High Efficiency | 2356 | 18 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials and shipping only. Exhaust fan, controls, wiring and associated appurtenances (excludes installation) Ventilation - Exhaust Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. | Each | $584.15 | 1 | $584.15 |
| Door, Steel | 2391 | Heavy duty fire rated steel door, full panel flush, 18 gauge, 4' x 7'. Materials only. | Each | $1,064.26 | 2 | $2,128.52 |
| Pump, Sump, less than 1/4 HP | 2582 | Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor). | Each | $173.78 | 1 | $173.78 |
| Hazardous Material Storage Cabinet, Standard | 2650 | Flammable storage cabinet designed to store toxic and otherwise dangerous flammable chemicals, Standard size 43 x 18 x 65 in., double wall, and 45 gal. capacity. To comply with NFPA 1 fire code, the self-closing cabinet is required in the following states: AK, CA, HI, ID, MT, NC, NV, OR, UT, and WA. | Each | $683.99 | 1 | $683.99 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #2 - Handling Pad without a building

**Scenario Description:**

An agrichemical storage and handling facility is constructed including a slab for storage, mixing, and loading operations. This practice addresses water quality degradation and due to mishandling, storing and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Access Road (560), Pipeline (430, 516), Roof Runoff Management (558), Pumping Plant (533), Nutrient Management (590), Integrated Pest Management (595)

**Before Situation:**

Agrichemicals are improperly stored on the ground or next to a well. Operator mixes the agrichemicals and fills the sprayer tank next to a hydrant. Spills or overflows of agrichemicals contaminate the soil, runoff to surface waters and leaching to ground water.

**After Situation:**

An agrichemical storage and handling facility is constructed on a slab without a roof. The average size of the agrichemical handling facility for storage and mixing and loading is 35' x 40' with an application equipment length of 36 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad with footings for mixing and loading with proper storage of associated dry and/or liquid agrichemicals. The concrete is sealed and sloped to a collection sump (precast catch basin). On three sides, the facility is surrounded by curbs, and one side has a ramp for containment. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Feature Measure:** Total Containment Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1,400.0

**Scenario Total Cost:** $17,165.44

**Scenario Cost/Unit:** $12.26

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 22 | $6,181.34 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 13 | $5,680.87 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 25 | $109.25 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 8 | $519.36 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 26 | $730.86 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $588.77 | 1 | $588.77 |
| Painting, concrete surface, impermeable | 1497 | Painting of concrete surfaces with an impermeable coating. Includes materials and application. | Square Foot | $1.06 | 1400 | $1,484.00 |
| Emergency shower and eye wash station | 1499 | Emergency shower and ewe wash station unit. Materials only. | Each | $603.40 | 1 | $603.40 |
| Pump, Sump, less than 1/4 HP | 2582 | Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor). | Each | $173.78 | 1 | $173.78 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #4 - Fabricated Liquid Storage with adjacent Concrete Handling Pad

**Scenario Description:**

This practice scenario is a fabricated agrichemical handling facility for storage of liquid agrichemicals along with an adjacent concrete mixing and loading pad. Due to topography, limited site space and/or geological conditions a fabricated structure with flexible membrane lined walls is needed. This practice addresses water quality degradation and due to mis-handling, storing, and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Access Road (560), Pipeline (516), Pumping Plant (533), Nutrient Management (590), Integrated Pest Management (595), Pond Sealing or Lining Flexible Membrane (521A)

**Before Situation:**

Agrichemicals are improperly stored on the ground or next to a well. Operator mixes the agrichemicals and fills the sprayer tank next to a hydrant. Spills or overflows of agrichemicals contaminate the soil, runoff to surface waters and leaching to ground water.

**After Situation:**

An agrichemical handling facility is constructed for storage of liquid agrichemicals along with a handling pad for mixing and loading operations. The average size of the agrichemical handling facility for proper storage of liquid agrichemicals is in fabricated containment that is 30 ft x 40 ft with formed, reinforced concrete walls. A handling pad for mixing and loading is located next to the liquid containment and is 16' x 32' with an application equipment length of 28 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading. The concrete is sealed and sloped to a collection sump (precast catch basin). This practice will contain agrichemicals and prevent contamination of surface and ground water resources. Liner for liquid storage should be contracted as Pond Sealing or Lining Flexible Membrane (521A)

**Feature Measure:** Liquid Containment Area + Handlin

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1,712.0

**Scenario Total Cost:** $17,983.68

**Scenario Cost/Unit:** $10.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 28 | $7,867.16 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 14 | $6,117.86 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 15 | $38.25 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 8 | $519.36 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 8 | $350.24 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 38 | $1,068.18 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 4 | $113.96 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $588.77 | 1 | $588.77 |
| Painting, concrete surface, impermeable | 1497 | Painting of concrete surfaces with an impermeable coating. Includes materials and application. | Square Foot | $1.06 | 512 | $542.72 |
| Emergency shower and eye wash station | 1499 | Emergency shower and ewe wash station unit. Materials only. | Each | $603.40 | 1 | $603.40 |
| Pump, Sump, less than 1/4 HP | 2582 | Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor). | Each | $173.78 | 1 | $173.78 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #5 - Outdoor Liquid Agrichemical Storage with a Roofed Building for Dry Chemical Storage and Handling Pad

**Scenario Description:**

This practice scenario is an outdoor, earthen lined agrichemical handling facility for storage of liquid agrichemicals along with a roofed mixing and loading pad that is also sized to store dry chemicals. This practice addresses water quality degradation and due to mishandling, storing, and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Access Road (560), Pipeline (516), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595), Pond Sealing or Lining Flexible Membrane (521A), Roof Runoff Management (558)

**Before Situation:**

Agrichemicals are improperly stored on the ground or next to a well. Operator mixes the agrichemicals and fills the sprayer tank next to a hydrant. Spills or overflows of agrichemicals contaminate the soil, runoff to surface waters and leaching to ground water.

**After Situation:**

An agrichemical handling facility is constructed for storage of liquid agrichemicals along with a roofed building to store dry agrichemicals with a handling pad for mixing and loading operations. The average size of the agrichemical handling facility for proper storage of liquid agrichemicals is in an earthen lined containment with bottom dimensions of 60 ft x 40 ft. A roofed building for dry agrichemicals and handling pad for mixing and loading is located next to the liquid containment and is 30' x 40' with an application equipment length of 36 ft. The handling pad for mixing and loading operations is roofed and sized to contain the length of the agrichemical spray tank and its volume. Install a curbed (6") reinforced concrete handling pad for mixing and loading. The concrete is sealed and sloped to a collection sump, facility containment has at least two sides constructed of 5 ft post and plant walls. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Feature Measure:** Floor surface area of Liquid Contai

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 3,600.0

**Scenario Total Cost:** $33,338.05

**Scenario Cost/Unit:** $9.26

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 19 | $5,338.43 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 3 | $1,310.97 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 231 | $589.05 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 380 | $877.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 19 | $534.09 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 38 | $1,082.62 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 853 | $818.88 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $588.77 | 1 | $588.77 |
| Painting, concrete surface, impermeable | 1497 | Painting of concrete surfaces with an impermeable coating. Includes materials and application. | Square Foot | $1.06 | 1200 | $1,272.00 |
| Emergency shower and eye wash station | 1499 | Emergency shower and ewe wash station unit. Materials only. | Each | $603.40 | 1 | $603.40 |
| Roof, Post Frame Building, 30' to 60' wide | 1676 | Post Frame Building, no sides, - 30' to 60' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation preparation. | Square Foot | $8.62 | 2000 | $17,240.00 |
| Pump, Sump, less than 1/4 HP | 2582 | Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor). | Each | $173.78 | 1 | $173.78 |

**Mobilization**

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #6 - Concrete Pad For Mixing and Loading

**Scenario Description:**

This practice scenario is an agrichemical handling facility for mixing and loading operations. This practice addresses water quality degradation and due to mishandling, and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Access Road (560), Pipeline (516), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595)

**Before Situation:**

Agrichemicals are improperly stored on the ground or next to a well. Operator mixes the agrichemicals and fills the sprayer tank next to a hydrant. Spills or overflows of agrichemicals contaminate the soil, runoff to surface waters and leaching to ground water.

**After Situation:**

This scenario is an agrichemical handling facility pad for mixing and loading operations. The average size of the agrichemical handling pad for mixing and loading is 16' x 40' with an application equipment length of 36 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading. The concrete is sealed and sloped to a collection sump, containment of the pad is surrounded by sloped and ramped reinforced concrete. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Feature Measure:** Total Containment Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 640.0

**Scenario Total Cost:** $6,488.96

**Scenario Cost/Unit:** $10.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 12 | $3,371.64 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 4 | $259.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 10 | $281.10 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $588.77 | 1 | $588.77 |
| Painting, concrete surface, impermeable | 1497 | Painting of concrete surfaces with an impermeable coating. Includes materials and application. | Square Foot | $1.06 | 640 | $678.40 |
| Emergency shower and eye wash station | 1499 | Emergency shower and ewe wash station unit. Materials only. | Each | $603.40 | 1 | $603.40 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #7 - For Greenhouse, Pallet Drum Storage And Poly Pad For Handling

**Scenario Description:**

This practice scenario is an agrichemical storage and handling facility for mixing and loading operations within a greenhouse. This practice addresses water quality degradation and due to mis-handling, storing, and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Pipeline (516), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595)

**Before Situation:**

Agrichemicals are improperly stored on the ground or next to a well. Operator mixes the agrichemicals and fills the sprayer tank next to a hydrant. Spills or overflows of agrichemicals contaminate the soil, runoff to surface waters and leaching to ground water.

**After Situation:**

This scenario is an agrichemical handling facility storage an impermeable barrier poly pad for mixing and loading operations. The average size of the agrichemical handling storage is for a pallet drum on a 5 ft x 5 ft (25 sf)containment pallet with sump capacity included. A poly pad is used for mixing and loading that is 8ft x 8ft (64 sf) with an application equipment length of 4 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. This practice will contain agrichemicals and prevent contamination of surface and ground water resources. Total unit are is 64 sf + 25 sf = 89 sf

**Feature Measure:** Storage Area + Mixing Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 89.0

**Scenario Total Cost:** $1,823.25

**Scenario Cost/Unit:** $20.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| 2 Drum Spill Pallet, 66 Gallon | 1610 | Pre fabricated containment basin with a capacity of approximately 66 gal. Materials only. | Each | $295.57 | 1 | $295.57 |
| PVC Containment Basin, 6' x 6' | 1611 | Poly containment basin typically 8" to 12" deep with area dimensions in the range of 6' x 6' or larger. | Square Foot | $20.32 | 64 | $1,300.48 |

**Practice:** 311 - Alley Cropping

**Scenario** #1 - Tree Planting, Single Row

**Scenario Description:**

The crop or grass land is planted with rows of trees to increase crop diversity. Final row width, and spacing of trees within the row, is based on farm equipment size, growth form of trees, light needs of annual crop or grass, and intent of the landowner. Typically 2-3 gallon potted seedlings are used, staked and tube-protected. The resource concerns are plant condition - inadequate structure and composition.

**Before Situation:**

The landscape has been cropped or in perennial grass for many years. It is void of any perennial tree vegetation. On cropland site preparation needs may need deep ripping to eliminate any plow pan and on grass land competing vegetation control is accomplished prior to tree planting.

**After Situation:**

Trees have been established to diversify the crop production of the field. Typically the area planted is 10 acres on approximately 12 x 40 foot spacing.

**Feature Measure:** planted seedling

**Scenario Unit::** Each

**Scenario Typical Size:** 900.0

**Scenario Total Cost:** $23,776.16

**Scenario Cost/Unit:** $26.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 80 | $574.40 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 90 | $5,097.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 180 | $5,112.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 80 | $2,169.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 20 | $945.00 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, potted or B&B, 2-3 gal. | 1532 | Potted or balled and burlapped hardwood tree, 2-3 gal. Includes materials and shipping only. | Each | $7.08 | 900 | $6,372.00 |
| Tree shelter, solid tube type, 5" x 48" | 1571 | 5" x 48" tree tube for protection from animal damage. Materials only. | Each | $2.15 | 900 | $1,935.00 |
| Cable ties, plastic | 1575 | Plastic cable ties (typ. 8-12") to assist in securing items. Materials only. | Each | $0.05 | 900 | $45.00 |
| Stakes, wood, 3/4" x 3/4" x 60" | 1583 | 3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only. | Each | $1.60 | 900 | $1,440.00 |

**Practice:** 311 - Alley Cropping

**Scenario** #2 - Tree Planting, 3-Row Sets

**Scenario Description:**

Cropland is planted with trees in 3-row sets with 40 foot alleyways in between. The outside rows of trees are conifers and the center row a mast-producing high-value hardwood timber species. Typically bare root stock protected with tubes are used for hardwoods; conifers are planted as containers. Between row spacing is 16 feet and between tree spacing is 10 feet. The resource concerns are Plant Condition - inadequate structure and composition; Soil Erosion (wind); Excess/ Insufficient Water (inefficient moisture management); Inadequate Habitat for Fish and Wildlife (food, cover/shelter, continuity).

**Before Situation:**

The landscape has been cropped for many years. It is void of any perennial tree vegetation. Wind erosion is evident, insufficient water for crops occurs due to excessive winds, wildlife habitat score is very low due to the lack of any perennial vegetation. Site preparation needs may include deep ripping to eliminate any plow pan prior to tree planting.

**After Situation:**

Trees have been established to diversify the crop production, reduce erosion by wind and water and improve growing conditions for crops in alleyways. Typically the area planted is 10 acres.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,503.89

**Scenario Cost/Unit:** $550.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| Mechanical tree planter | 1600 | Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor. | Hour | $7.01 | 2.5 | $17.53 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 2.5 | $67.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 12 | $567.00 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.54 | 605 | $326.70 |
| Tree, conifer, seedling, containerized, 10 cu. in. | 1519 | Containerized conifer stock, 10 cubic inches (approx 6" plug), 1.7" x 6"). Includes materials and shipping only. | Each | $0.83 | 1210 | $1,004.30 |
| Tree shelter, solid tube type, 5" x 48" | 1571 | 5" x 48" tree tube for protection from animal damage. Materials only. | Each | $2.15 | 605 | $1,300.75 |
| Cable ties, plastic | 1575 | Plastic cable ties (typ. 8-12") to assist in securing items. Materials only. | Each | $0.05 | 605 | $30.25 |
| Stakes, wood, 3/4" x 3/4" x 60" | 1583 | 3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only. | Each | $1.60 | 605 | $968.00 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #1 - Earthen Facility, < 50K ft3 Storage

**Scenario Description:**

An earthen liquid waste impoundment constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume of 50,000 ft3 or less. Construction of the structure includes excavation of earth material, where 80 to 100 percent of which is used to build an associated embankment. Earthen storage liners are addressed with another standard. This scenario covers the earthwork associated with installation of the pond. The liner should be contracted under the appropriate 521 standard; any hardened areas for access or maintenance should be contracted using Heavy Use area protection (561); fencing should be contracted under Fence (382); and seeding of the embankment should be contracted under Critical Area Planting (342). Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roofs and Covers (367), and Solid/Liquid Waste Separation Facility (632), Waste Treatment (629) .

**Before Situation:**

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

An earthen storage structure constructed from on-site material provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : Gross storage volume 42,696 ft3; 95x95'' (top); 3:1 inside and 2:1 outside side slopes; cut/fill ratio = 1.25; total depth = 8.4' (design depth = 6.4'); (not include in volume - 1' freeboard and 1' sludge accumulation).

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 42,696.0

**Scenario Total Cost:** $12,049.00

**Scenario Cost/Unit:** $0.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 844 | $3,688.28 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 616 | $2,211.44 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.68 | 1671 | $6,149.28 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #2 - Earthen Facility, < 50K ft3 Storage, Imported Fill

**Scenario Description:**

An earthen liquid waste impoundment constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume of 50,000 ft3 or less. Site conditions limit excavation depths so that the structure must be mostly above existing grade. Construction of the structure includes minor excavation of earth material at the site, where minimal amounts are used to build the associated embankment. This scenario is for situations when over 80 percent of the required fill must be imported from 1 mile away to construct the embankment. Earthen storage liners are addressed with another standard. This scenario covers the earthwork associated with installation of the pond. The liner should be contracted under the appropriate 521 standard; any hardened areas for access or maintenance should be contracted using Heavy Use area protection (561); fencing should be contracted under Fence (382); and seeding of the embankment should be contracted under Critical Area Planting (342). Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roofs and Covers (367), and Solid/Liquid Waste Separation Facility (632), Waste Treatment (629) .

**Before Situation:**

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

An earthen storage structure constructed from on-site and remote materials provide an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : design storage volume 42,696 ft3; 95x95'' (top); 3:1 inside and 2:1 outside side slopes; cut/fill ratio = 1.25; total depth = 8.4' (design depth = 6.4'); (not include in volume - 1' freeboard and 1' sludge accumulation). Assumes all material is imported for embankment..

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 42,696.0

**Scenario Total Cost:** $60,318.65

**Scenario Cost/Unit:** $1.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 3378 | $14,761.86 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 85 | $13,722.40 |
| Excavation, clay, large equipment, 1500 ft | 1217 | Bulk excavation of clay with scrapers with average haul distance of 1500 feet. Includes equipment and labor. | Cubic Yard | $6.41 | 4223 | $27,069.43 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 4223 | $1,351.36 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 85 | $3,413.60 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #3 - Earthen Facility, > 50K ft3 Storage

**Scenario Description:**

An earthen liquid waste impoundment constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume greater than 50,000 ft3. Construction of the structure includes excavation of earth material, all, some, or none of which is used to build an associated embankment. Earthen storage liners are addressed with another standard. This scenario covers the earthwork associated with installation of the pond. The liner should be contracted under the appropriate 521 standard; any hardened areas for access or maintenance should be contracted using Heavy Use area protection (561); fencing should be contracted under Fence (382); and seeding of the embankment should be contracted under Critical Area Planting (342). Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roofs and Covers (367), and Solid/Liquid Waste Separation Facility (632), Waste Treatment (629) .

**Before Situation:**

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

An earthen storage structure constructed from on-site material provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size: Gross pone volume is 585,279 cf; 250'x250' (top); 3:1 inside and 2:1 outside side slopes; total depth = 13' (design depth = 11'); (not include in volume - 1' freeboard and 1' sludge accumulation). Assumes cut and fill is balanced on site.

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 585,279.0

**Scenario Total Cost:** $83,880.10

**Scenario Cost/Unit:** $0.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 2222 | $9,710.14 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 8796 | $31,577.64 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.68 | 11574 | $42,592.32 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #4 - Earthen Facility, >50K ft3 Storage, Imported Fill

**Scenario Description:**

An earthen liquid waste impoundment constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume greater than 50,000 ft3. Construction of the structure includes excavation of earth material, none of which is used to build an associated embankment. This scenario is for situations when over 80 percent of the required fill must be imported from 1 mile away to construct the embankment. Earthen storage liners are addressed with another standard. This scenario covers the earthwork associated with installation of the pond. The liner should be contracted under the appropriate 521 standard; any hardened areas for access or maintenance should be contracted using Heavy Use area protection (561); fencing should be contracted under Fence (382); and seeding of the embankment should be contracted under Critical Area Planting (342). Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roofs and Covers (367), and Solid/Liquid Waste Separation Facility (632), Waste Treatment (629) .

**Before Situation:**

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

An earthen storage structure constructed from on-site material provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size: Gross pone volume is 585,279 cf; 250'x250' (top); 3:1 inside and 2:1 outside side slopes; total depth = 13' (design depth = 11'); (not include in volume - 1' freeboard and 1' sludge accumulation). Assumes all material is imported for embankment.

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 585,279.0

**Scenario Total Cost:** $360,014.50

**Scenario Cost/Unit:** $0.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 20200 | $88,274.00 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 505 | $81,527.20 |
| Excavation, clay, large equipment, 1500 ft | 1217 | Bulk excavation of clay with scrapers with average haul distance of 1500 feet. Includes equipment and labor. | Cubic Yard | $6.41 | 25250 | $161,852.50 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 25250 | $8,080.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 505 | $20,280.80 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #5 - Above Ground Steel, < 25K ft3 storage

**Scenario Description:**

An above ground circular glass-lined steel constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario is intended for sites located on firm foundations as determined by a qualified engineer and/or the State Geologist and where the potential for settlement is minimal as determined. Additionally, the project site is in a location where open storage ponds are not permissible due to law or site constraints, or concrete tanks are too costly due to the distance from a certified concrete batching plant or a licensed, experienced contractor. To use this scenario, the steel tank must be the least expensive alternative to handle design storage volumes less than 25,000 cubic feet. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

**Before Situation:**

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

An above ground storage structure provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : design storage volume 13,983 ft3, 31' diameter by 18.81' high glass lined steel tank.

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 13,983.0

**Scenario Total Cost:** $82,919.19

**Scenario Cost/Unit:** $5.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Waste Storage, Glass lined steel structure (<25,000 ft3) | 1616 | Includes materials, equipment and labor to install 31' (diameter) X19' (height) steel lined structure. Includes materials, equipment and labor. | Cubic Foot | $5.93 | 13983 | $82,919.19 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #6 - Above Ground Steel, >25K ft3 storage

**Scenario Description:**

An above ground circular glass lined steel constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario is intended for sites located on firm foundations as determined by a qualified engineer and/or the State Geologist and where the potential for settlement is minimal as determined. Additionally, the project site is in a location where open storage ponds are not permissible due to law or site constraints, or concrete tanks are too costly due to the distance from a certified concrete batching plant or a licensed, experienced contractor. To use this scenario, the steel tank must be the least expensive alternative to handle design storage volumes greater than 25,000 cubic feet. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

**Before Situation:**

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

An above ground storage structure provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : design storage volume 520,400 gallons or 69,567 cf, 62' diameter steel tank 23' 10" high

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 69,567.0

**Scenario Total Cost:** $146,786.37

**Scenario Cost/Unit:** $2.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Waste Storage, glass lined steel structure, 25,000 - 100,000 cubic foot | 1620 | Includes materials, equipment and labor to install a steel glass lined structure (based on typical 73' diameter X 19' height) . Includes materials, equipment and labor. | Cubic Foot | $2.11 | 69567 | $146,786.37 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #7 - Above Ground Steel, >25K ft3 storage, Foundation Improvement

**Scenario Description:**

An above ground circular glass lined steel constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario is intended for sites located on soft or organic soils foundations as determined by a qualified engineer and/or the State Geologist and where the potential for settlement is minimal as determined. Additionally, the project site is in a location where open storage ponds are not permissible due to law or site constraints, or concrete tanks are too costly due to the distance from a certified concrete batching plant or a licensed, experienced contractor. To use this scenario, the steel tank must be the least expensive alternative to handle design storage volumes greater than 25,000 cubic feet. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

**Before Situation:**

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

An above ground storage structure provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : design storage volume 520,400 gallons or 69,567 cf, 62' diameter steel tank 23' 10" high. Assumes that site requires over excavation of organic soils to a depth of 6', import of material from approximately 1 mile away, compaction of fill, and backfill outside foundation area with on site soils. Foundation removal diameter is 82', depth is 6'. Excavated hole volume is (82'/2)2 X 3.14 X 6' / 27 = 1173 cy

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 69,567.0

**Scenario Total Cost:** $167,826.56

**Scenario Cost/Unit:** $2.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 1173 | $5,126.01 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 30 | $4,843.20 |
| Excavation, clay, large equipment, 1500 ft | 1217 | Bulk excavation of clay with scrapers with average haul distance of 1500 feet. Includes equipment and labor. | Cubic Yard | $6.41 | 1466 | $9,397.06 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 1466 | $469.12 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 30 | $1,204.80 |
| **Materials** | | | | | | |
| Waste Storage, glass lined steel structure, 25,000 - 100,000 cubic foot | 1620 | Includes materials, equipment and labor to install a steel glass lined structure (based on typical 73' diameter X 19' height) . Includes materials, equipment and labor. | Cubic Foot | $2.11 | 69567 | $146,786.37 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #8 - Above Ground Concrete Tank

**Scenario Description:**

An above ground circular concrete storage tank constructed to store wastes such as liquid manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario is intended for sites located on firm foundations as determined by a qualified engineer and/or the State Geologist and where the potential for settlement is minimal as determined. Additionally the project site should be located in close proximity to a certified concrete batching plant in order to keep construction costs to a minimum. This scenario has a design storage volume of approximately 81,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

**Before Situation:**

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

An above ground 80' diameter concrete manure storage tank provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size: design storage volume 81,000 ft3, (not included - 1' freeboard); based on a standard 80' diameter, 16' tall concrete manure storage tank

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 81,000.0

**Scenario Total Cost:** $72,287.55

**Scenario Cost/Unit:** $0.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 93 | $26,130.21 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 99 | $43,262.01 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 103 | $2,895.33 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #9 - Above Ground Concrete Tank, Preload Foundation

**Scenario Description:**

An above ground circular concrete storage tank constructed to store wastes such as liquid manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario is intended for sites determined by a qualified engineer and/or the State Geologist to be located on weak foundations where the potential for settlement or bearing capacity issues is high. Preloading involves placement of fill equal to the estimated weight of a fully loaded, operation tank. This scenario is appropriate only for sites where preloading is the most cost-effective alternative (i.e. access and proximity to a borrow source, excessive settlement can only be managed by preloading, etc.). Once the site has been adequately preloaded, as determined by a qualified NRCS representative, the preload material is removed and a standard concrete tank is constructed. The project site should be located in close proximity to a certified concrete batching plant in order to keep construction costs to a minimum. This scenario has a design storage volume of approximately 81,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

**Before Situation:**

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

Preload material is placed in controlled lifts, site is adequately consolidated under the weight of the preload, preload material is removed, and an above ground 80' diameter concrete manure storage tank provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size: design storage volume 81,000 ft3, (not included - 1' freeboard); based on a standard 80' diameter, 16' tall concrete manure storage tank

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 81,000.0

**Scenario Total Cost:** $80,400.87

**Scenario Cost/Unit:** $0.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 93 | $26,130.21 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 99 | $43,262.01 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 1116 | $4,006.44 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.68 | 1116 | $4,106.88 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 103 | $2,895.33 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #10 - Above Ground Concrete Tank, Preload Foundation and Elevated Pad

**Scenario Description:**

An above ground circular concrete storage tank constructed to store wastes such as liquid manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario is appropriate for sites determined by a qualified NRCS representative to be located on a weak foundation and in need of preloading (placement of fill equal to the estimated weight of a fully loaded, operation tank) AND needs to be elevated above the floodplain. This scenario is intended for sites determined by a qualified engineer and/or the State Geologist to be located on weak foundations where the potential for settlement or bearing capacity issues is high. Preloading involves placement of fill equal to the estimated weight of a fully loaded, operation tank. This scenario is appropriate only for sites where preloading is the most cost-effective alternative (i.e. access and proximity to a borrow source, excessive settlement can only be managed by preloading, etc.). Once the site has been adequately preloaded, as determined by a qualified NRCS representative, the preload material is removed and a standard concrete tank is constructed. The project site should be located in close proximity to a certified concrete batching plant in order to keep construction costs to a minimum. This scenario has a design storage volume of approximately 81,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

**Before Situation:**

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

Preload material is placed in controlled lifts, site is adequately consolidated under the weight of the preload, preload material is removed, and an above ground 80' diameter concrete manure storage tank provides an environmentally safe facility for storing manure and other agricultural waste by-products. A 2' high rock pad (w/ 2:1 side slopes) is constructed to elevate tank above the floodplain. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size: design storage volume 81,000 ft3, (not included - 1' freeboard); based on a standard 80' diameter, 16' tall concrete manure storage tank

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 81,000.0

**Scenario Total Cost:** $88,453.27

**Scenario Cost/Unit:** $1.09

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 93 | $26,130.21 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 99 | $43,262.01 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 1116 | $4,006.44 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.68 | 1116 | $4,106.88 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 103 | $2,895.33 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 410 | $8,052.40 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #11 - Above Ground Concrete Tank, Extra Reinforced Slab

**Scenario Description:**

An above ground circular concrete storage tank constructed to store wastes such as liquid manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario is intended for sites determined by a qualified engineer and/or the State Geologist to be located on weak foundations where the potential for settlement or bearing capacity issues is high and an additionally reinforced slab, footing and wall thickness to handle any expected differential settlement at the site. This scenario is only appropriate for sites where settlement is expected to be no greater than 4" to 6". The project site should be located in close proximity to a certified concrete batching plant in order to keep construction costs to a minimum. This scenario has a design storage volume of approximately 81,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

**Before Situation:**

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

An above ground 80' diameter concrete manure storage tank provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size: design storage volume 81,000 ft3, (not included - 1' freeboard); based on a standard 80' diameter, 16' tall concrete manure storage tank

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 81,000.0

**Scenario Total Cost:** $102,847.12

**Scenario Cost/Unit:** $1.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 124 | $34,840.28 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 149 | $65,111.51 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 103 | $2,895.33 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #12 - Above Ground Concrete Tank, Foundation Improvement

**Scenario Description:**

An above ground circular concrete storage tank constructed to store wastes such as liquid manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario is intended for sites determined by a qualified engineer and/or the State Geologist to be located on weak foundations where the potential for settlement or bearing capacity issues is high. Foundation improvement involves the removal and replacement of questionable soils with more competent soils. This scenario is appropriate only for sites where foundation improvement is the most cost-effective alternative (i.e. depth of questionable soils does not exceed 4 ft). Once the site has been adequately improved, as determined by a qualified NRCS representative, a standard concrete tank is constructed. The project site should be located in close proximity to a certified concrete batching plant in order to keep construction costs to a minimum. This scenario has a design storage volume of approximately 81,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

**Before Situation:**

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

Problem soil is removed/replaced or improved to permit for an above ground 80' diameter concrete manure storage tank provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size: design storage volume 81,000 ft3, (not included - 1' freeboard); based on a standard 80' diameter, 16' tall concrete manure storage tank

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 81,000.0

**Scenario Total Cost:** $238,331.61

**Scenario Cost/Unit:** $2.94

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 93 | $26,130.21 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 99 | $43,262.01 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 744 | $3,251.28 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 744 | $2,670.96 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 930 | $150,139.20 |
| Excavation, clay, large equipment, 150 ft | 1219 | Bulk excavation of clay with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $6.19 | 930 | $5,756.70 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.68 | 744 | $2,737.92 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 4650 | $1,488.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 103 | $2,895.33 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #15 - Drystack, Concrete floor, No walls

**Scenario Description:**

This scenario consists of a dry stack facility with a reinforced concrete floor without side walls. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. This scenario is required when a slab is designed as water tight or when the subgrade requires steel reinforcing. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical is 1,600 SqFt (40'x40'). The site floor will be prepared by stripping the top 1' of soil as needed, placing 6" of a sand/gravel base and pouring a 6" reinforced concrete slab with 1 foot footing on all four sides. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1,600.0

**Scenario Total Cost:** $9,272.40

**Scenario Cost/Unit:** $5.80

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 30 | $8,429.10 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 30 | $843.30 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #16 - Drystack, Concrete floor, Wood walls

**Scenario Description:**

This scenario consists of a dry stack facility with a concrete floor with wood side walls. This scenario is intended for sites where wall height restrictions, available space, roof type/layout or other site features do not allow for the use of concrete walls. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical facility consists of a 40' X 40' concrete slab (outside dimensions) with a 1' high poured concrete curbs with footings measuring 1' X 2' beneath them. The walls are constructed from 6' X 6' posts. Quantities were calculated using 5.5' long posts as an average of 8' long posts embedded 4' and 3' long posts mounted atop the curb. The storage volume inside the walls is 38.5'L X 37'W x 4'H (5,698 cubic feet). Manure and other agricultural by-products are being controlled by the collection at the source and stored temporarily at an environmentally suitable location until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Total slab area = 1600 sf. Wall length = 38.5' + 38.5' +37' = 114'

**Feature Measure:** Cubic foot of storage

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 5,700.0

**Scenario Total Cost:** $14,176.31

**Scenario Cost/Unit:** $2.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 33 | $9,272.01 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 60 | $138.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 30 | $843.30 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 720 | $691.20 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.76 | 545 | $959.20 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #18 - Drystack, Concrete floor, Concrete walls

**Scenario Description:**

This scenario consists of a small dry stack facility (1600 square feet or less) with a concrete floor and formed concrete side walls. This scenario is intended for sites that require the use of concrete walls due to roof loads or durability requirements. The availability of an experienced licensed contractor and/or its proximity to a certified concrete batching plant. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical facility consists of a 40' X 40' concrete slab (outside dimensions) with 4' high poured concrete walls 6" wide with footings measuring 1' X 2' beneath them. The storage volume inside the walls is 38.5'L X 37'W x 4'H (5,698 cubic feet). Manure and other agricultural by-products are being controlled by the collection at the source and stored temporarily at an environmentally suitable location until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Total slab area = 1600 sf. Wall length = 38.5' + 38.5' +37' = 114'

**Feature Measure:** Cubic foot of storage

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 5,700.0

**Scenario Total Cost:** $14,748.76

**Scenario Cost/Unit:** $2.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 35 | $9,833.95 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 9 | $3,932.91 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 60 | $138.60 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 30 | $843.30 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #19 - Drystack, Concrete floor, Precast concrete block walls

**Scenario Description:**

This scenario consists of a dry stack facility with a concrete floor and precast concrete block side walls. This scenario is intended for sites that permit the use of block walls due to lower roofing requirements, loads and appropriate site condition. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical facility consists of a 40' X 40' concrete slab (outside dimensions), which includes a 1' wide curb behind 2' X 2' X6' precast concrete blocks stacked two-high atop the slab. The storage volume inside the block walls is 37'L X 34'W x 4'H (5,032 cubic feet).manure and other agricultural by-products are being controlled by the collection at the source and stored temporarily at an environmentally suitable location until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Slab area = 1600 sf. Curb length = 40' + 40' +38' = 118'

**Feature Measure:** Cubic Feet of storage area

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 5,030.0

**Scenario Total Cost:** $15,981.44

**Scenario Cost/Unit:** $3.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 40 | $11,238.80 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 60 | $138.60 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 30 | $843.30 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $110.61 | 34 | $3,760.74 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #20 - Drystack, Concrete floor, Precast concrete block walls, in remote location

**Scenario Description:**

This scenario consists of a dry stack facility with a concrete floor and precast concrete block side walls. This scenario is intended for sites that are at least 30 miles from a concrete batch plant which allow the use of block walls due to lower roofing requirements, loads and appropriate site condition. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical facility consists of a 40' X 40' concrete slab (outside dimensions), which includes a 1' wide curb behind 2' X 2' X6' precast concrete blocks stacked two-high atop the slab. The storage volume inside the block walls is 37'L X 34'W x 4'H (5,032 cubic feet).manure and other agricultural by-products are being controlled by the collection at the source and stored temporarily at an environmentally suitable location until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Slab area = 1600 sf. Curb length = 40' + 40' +38' = 118'

**Feature Measure:** Cubic Feet of storage area

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 5,100.0

**Scenario Total Cost:** $18,021.44

**Scenario Cost/Unit:** $3.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 40 | $11,238.80 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 60 | $138.60 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 30 | $843.30 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $110.61 | 34 | $3,760.74 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 2000 | $2,040.00 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #21 - Buried concrete tank, Small, without Lid

**Scenario Description:**

This scenario consists of a small below ground tank without a lid for storage of liquid manure/wastes. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical scenario is 20'x40' below ground scrape tank that is 6' deep. Walls are formed reinforced concrete, assume 2' footing on outside of tank, 6' walls, 10" thick. Tank has a 'drivable ramp' on one side (with 5:1 slopes) to facilitate cleaning. Total storage volume is 2,500 cf. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $13,782.06

**Scenario Cost/Unit:** $5.51

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 19 | $5,338.43 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 13 | $5,680.87 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 335 | $773.85 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 197 | $1,136.69 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 19 | $534.09 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #22 - Buried concrete tank, Small, with Lid

**Scenario Description:**

This scenario consists of a small below ground tank (typically <7000 cf) with a lid for storage of liquid manure/wastes. A lid for the tank is required because the tank must be located in an area where traffic passes over. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical scenario is 30x30 below ground scrape tank that is 8' deep. Walls are formed reinforced concrete, 8' walls, 10" thick, lid is 10" thick. Total storage volume is 6,422 cf. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

**Feature Measure:** Gross Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 6,422.0

**Scenario Total Cost:** $44,698.80

**Scenario Cost/Unit:** $6.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 36 | $10,114.92 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 72.5 | $31,681.78 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 617 | $1,425.27 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 107 | $617.39 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 19 | $541.31 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #23 - Buried concrete tank, Large, without Lid

**Scenario Description:**

This scenario consists of a large below ground tank without a lid for storage of liquid manure/wastes. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Ramps adjacent to tank for loading or unloading are to be covered under 561- Heavy Use Area protection. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical scenario is a square tank that is 60'x60'x8' deep with a 12" base slab and 10" thick walls. Walls have 4' exterior footings. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

**Feature Measure:** Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 28,800.0

**Scenario Total Cost:** $128,364.35

**Scenario Cost/Unit:** $4.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 231 | $100,944.69 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 2452 | $5,664.12 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 1237 | $7,137.49 |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 40 | $7,623.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 60 | $1,704.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 86 | $2,417.46 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #24 - Buried concrete tank, Large, with Lid

**Scenario Description:**

This scenario consists of a large below ground tank with a lid for storage of liquid manure/wastes. A lid for the tank is required because the tank must be located in an area where traffic passes over. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical scenario is an oval shaped below ground tank with 13' interior diameter ends and a 25' long middle section, width is 26' interior. All walls are 10" thick, there is an interior wall running the length of the 25' section and an interior beam at one end running 26' long that is 12"x10". The lid and base are 12" thick. Gross storage volume is 64,655 gallons or 8,643 cf. Typical scenario assumes that the tank is 4' into the water table and buoyancy is accounted for in the design. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

**Feature Measure:** Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 8,643.0

**Scenario Total Cost:** $79,572.27

**Scenario Cost/Unit:** $9.21

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 131 | $57,245.69 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 1504 | $3,474.24 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 968 | $5,585.36 |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 40 | $7,623.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 60 | $1,704.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 46 | $1,293.06 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #26 - Composted Bedded Pack, Concrete floor, Concrete walls

**Scenario Description:**

This scenario consists of a composted bedded pack with concrete walls, footings and floor. This scenario is intended for situations where consistency of manure, geographical conditions or local regulations or policy do not permit the use of an earthen floor. The purpose of this practice is to properly compost animal manure until it can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical scenario is 4000 SqFt (40'x100'). The site will be prepared by stripping the top 1' of soil as needed, placing 6" of a sand/gravel base and pouring a 6" reinforced concrete slab. Walls are 4' high, 8" thick with a 3.5' wide footings. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,000.0

**Scenario Total Cost:** $49,673.18

**Scenario Cost/Unit:** $12.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 107 | $46,757.93 |
| Excavation, common earth, large equipment, 50 ft | 1222 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $1.55 | 148 | $229.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 16 | $756.00 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 74 | $1,453.36 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 314 - Brush Management

**Scenario** #1 - Hand Tools, Light

**Scenario Description:**

Using hand tools, such as chainsaws, axes, shovels, hoes, nippers, or brush pullers to remove or cut off woody plants at of below the root collar. This includes post-treatment pruning or lopping to adequately reduce woody species on the site. Typical areas have undesired woody species that are in the very early phases of succession. In juniper encroachment situations, this would generally represent areas with very light tree densities often characterized by <5% juniper canopy cover.

**Before Situation:**

Area is in the very early phases of undesired woody species encroachment that that is only beginning to degrade rangeland health, productivity, habitat for desired wildlife species. If woody species are allowed to expand, future degradation of ecological site condition results in loss of key forage/browse species, habitat loss for species of concern, increased risk of catastrophic fire, increased noxious and invasive species, increased soil erosion, and altered hydrologic regimes.

**After Situation:**

Encroaching woody species are cut and/or removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site degradation is prevented and condition maintains an upward trend. Desired hydrology, wildlife habitat, and plant health, vigor, and productivity are sustained.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $3,321.78

**Scenario Cost/Unit:** $41.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 80 | $343.20 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 3 | $83.28 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 8 | $40.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 96 | $2,726.40 |

**Practice:** 314 - Brush Management

**Scenario** #4 - Mechanical, Small Shrubs, Medium Infestation

**Scenario Description:**

Removal of small woody vegetation of medium density infestations. The practice entails the removal of brush typically by the use of mechanical cutter, chopper or other light equipment in order to reduce fuel loading and improve ecological site condition. Brush density has exceeded desired levels based on ecological site potential. It has been determined that the brush is at a medium infestation, typically considered 11-30% canopy cover. Small shrubs are generally those less than 4 feet tall.

**Before Situation:**

Area consist of excessive stands of shrub species degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:**

Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $14,605.02

**Scenario Cost/Unit:** $121.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 15 | $320.85 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 120 | $10,389.60 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 120 | $3,254.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 314 - Brush Management

**Scenario** #5 - Mechanical, Small Shrubs, Heavy Infestation

**Scenario Description:**

Removal of small woody vegetation of heavy density infestations. The practice entails the removal of brush typically by the use of mechanical cutter, chopper or other light equipment in order to reduce fuel loading and improve ecological site condition. Brush density has exceeded desired levels based on ecological site potential. It has been determined that the brush is at a heavy infestation, typically considered greater than 30% canopy cover. Small shrubs are generally those less than 4 feet tall. This scenario also applies to medium density small shrub infestations on sites with difficult conditions such as limited access, steep slopes, or large rocks or rock outcrops.

**Before Situation:**

Area consist of excessive stands of shrub species degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:**

Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $28,142.07

**Scenario Cost/Unit:** $234.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 10 | $213.90 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 240 | $20,779.20 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 240 | $6,508.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 314 - Brush Management

**Scenario** #7 - Mechanical, Large Woody, Medium Infestation

**Scenario Description:**

Removal of large woody vegetation of medium density infestations. The practice entails the removal of brush and/or trees typically by pushing, grubbing, masticating, chaining and then raking or piling in order to reduce fuel loading and improve ecological site condition. Brush density has exceeded desired levels based on ecological site potential. It has been determined that the brush is at a medium infestation, typically considered less than 11-30% canopy cover. Large shrubs are generally those greater than 4 feet tall.

**Before Situation:**

Area consist of excessive stands of shrub species degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:**

Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $47,624.84

**Scenario Cost/Unit:** $396.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 200 | $38,118.00 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 10 | $213.90 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 200 | $8,032.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 314 - Brush Management

**Scenario** #8 - Mechanical, Large Woody, Heavy Infestation

**Scenario Description:**

Removal of large woody vegetation of heavy density infestations. The practice entails the removal of brush and/or trees typically by pushing, grubbing, masticating, chaining then raking or piling in order to reduce fuel loading and improve ecological site condition. Brush density has exceeded desired levels based on ecological site potential. It has been determined that the brush is at a heavy infestation, typically considered greater than 30% canopy cover. Large shrubs are generally those greater than 4 feet tall. This scenario also applies to medium density large woody infestations on sites with difficult conditions such as limited access, steep slopes, or large rocks or rock outcrops.

**Before Situation:**

Area consist of excessive stands of shrub species degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:**

Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $59,505.54

**Scenario Cost/Unit:** $495.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 250 | $47,647.50 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 15 | $320.85 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 250 | $10,040.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 15 | $708.75 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 314 - Brush Management

**Scenario** #9 - Three Treatments

**Scenario Description:**

The practice entails the control of woody vegetation by treating it three times during the treatment period in order to improve ecological site condition. The brush can be treated with the same method repeatedly, or by a combination of methods. Woody vegetation needs to be treated at least three times in order to fully control it. Generally, the subsequent treatments will kill resprouting stems or those which survived the first treatments or newly sprouted seedlings. Brush density has exceeded desired levels based on ecological site potential. The practice is not completed until all treatments are completed.

**Before Situation:**

Area has excessive stands of woody species degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:**

Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $29,106.21

**Scenario Cost/Unit:** $242.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 15 | $320.85 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 120 | $6,115.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 240 | $1,444.80 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 240 | $5,836.80 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 120 | $3,254.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 15 | $708.75 |
| **Materials** | | | | | | |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $44.20 | 240 | $10,608.00 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 240 | $314.40 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 3 | $503.01 |

**Practice:** 314 - Brush Management

**Scenario** #10 - Two Treatments

**Scenario Description:**

The practice entails the control of woody vegetation by treating it twice during the treatment period in order to improve ecological site condition. The brush can be treated with the same method twice, or by a combination of methods. Woody vegetation needs to be treated at least twice in order to fully control it. Generally, the second treatment will kill resprouting stems or those which survived the first treatment or newly sprouted seedlings. Brush density has exceeded desired levels based on ecological site potential. The practice is not completed until both treatments are completed.

**Before Situation:**

Area has excessive stands of woody species degrading health and vigor of desirable species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:**

Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $18,034.14

**Scenario Cost/Unit:** $150.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 10 | $213.90 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 120 | $6,115.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 120 | $722.40 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 60 | $1,459.20 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 120 | $3,254.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Materials** | | | | | | |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $44.20 | 120 | $5,304.00 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 120 | $157.20 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 314 - Brush Management

**Scenario** #11 - Chemical, Spot Treatment

**Scenario Description:**

Land unit on which weed control using chemical spot treatment would be beneficial in order to accomplish objects such as: set back the plant community succession, improve the ecological condition, control invasive plants or improve forage conditions for domestic livestock or wildlife. The practice entails the eradication of vegetation by use of weed treatment, either initial or retreatment using equipment (such as a backpack, hand-sprayer or ATV-mounted wand) to apply chemicals, in order to eliminate noxious weeds, promote forage productivity, and improve ecological condition.

**Before Situation:**

Area consists of excessive stands of woody plants degrading health and vigor of desirable plant species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:**

Woody plants are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology or plant health and vigor is returning to near normal levels, and wildlife habitat is improved.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,312.92

**Scenario Cost/Unit:** $231.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 20 | $1,274.20 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 18 | $499.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 3 | $141.75 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 2.5 | $47.18 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 314 - Brush Management

**Scenario** #13 - High Cost Chemical

**Scenario Description:**

Apply brush management through the use of broadcast application of herbicide to reduce or remove undesirable species of brush. A low cost chemical will not adequately address the resource concern(s), so a high cost chemical will need to be used.

**Before Situation:**

Area consists of excessive stands of woody plants degrading health and vigor of desirable plant species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:**

Woody plants are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology or plant health and vigor is returning to near normal levels, and wildlife habitat is improved.

**Feature Measure:** Acres Treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 160.0

**Scenario Total Cost:** $9,669.77

**Scenario Cost/Unit:** $60.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 160 | $963.20 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 40 | $972.80 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 40 | $1,084.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 160 | $6,052.80 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 160 | $209.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 314 - Brush Management

**Scenario** #14 - Hand - Difficult or Adverse

**Scenario Description:**

Species such as English Ivy, clematis, or very large infestations of blackberry or Japanese-type knotweeds are well-established, causing degradation of ecological site condition. Control is by hand, and conditions are adverse because of size and density of target species, terrain, or degree of twining of vines into the tree canopy. Site needs multiple treatments. Payment is made on actual area of infestation and after all treatments are completed.

**Before Situation:**

On any landuse except active cropland, species such as English Ivy, clematis, or large infestations of blackberry or Japanese-type knotweeds are well-established, causing degradation of ecological site condition. Conditions are adverse because of size and density of target species, terrain, or degree of twining of vines into the tree canopy, and the need for multiple control treatments over a period of time.

**After Situation:**

Target weedy species are removed, and ecological site condition will improve as desirable species become dominant once again.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $2,495.03

**Scenario Cost/Unit:** $831.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 5 | $106.95 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 25 | $1,592.75 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 25 | $126.75 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $44.20 | 6 | $265.20 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 6 | $7.86 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 3 | $206.52 |

**Practice:** 314 - Brush Management

**Scenario** #15 - Hand Tools, Medium

**Scenario Description:**

Using hand tools, such as chainsaws, axes, shovels, hoes, nippers, or brush pullers to remove or cut off woody plants at of below the root collar. This includes post-treatment pruning or lopping to adequately reduce woody species on the site. Typical areas have undesired woody species that are in the early-to-mid phases of succession. In juniper encroachment situations, this would generally represent areas with medium tree densities often characterized by 5-10% juniper canopy cover but could also include areas with less canopy cover comprised of many small trees. Typical unit is 80 acres.

**Before Situation:**

Area is in the early-to-mid phases of undesired woody species encroachment that degrades rangeland health, productivity, habitat for desired wildlife species. If woody species are allowed to expand, future degradation of ecological site condition results in loss of key forage/browse species, habitat loss for species of concern, increased risk of catastrophic fire, increased noxious and invasive species, increased soil erosion, and altered hydrologic regimes.

**After Situation:**

Encroaching woody species are cut and/or removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site degradation is reversed and condition continues progressing in an upward trend. Desired hydrology, wildlife habitat, and plant health, vigor, and productivity are sustained.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $14,139.59

**Scenario Cost/Unit:** $176.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 320 | $1,372.80 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 25 | $534.75 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 13 | $360.88 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 28 | $141.96 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 413 | $11,729.20 |

**Practice:** 314 - Brush Management

**Scenario** #16 - Multiple treatment Complex

**Scenario Description:**

Using a combination of hand tools, such as chainsaws, axes, shovels, nippers, or brush pullers to remove or cut off woody plants at of below the root collar followed by herbicide application. This includes post-treatment pruning or lopping and chemical application to adequately reduce woody species on the site. Typical areas have undesired woody species such as Tamarix aphylla, Elaeagnus angustifolia or Ailanthus altissima, English Ivy, clematis, or very large infestations of blackberry or Japanese-type knotweeds that are very difficult to eradicate. These species typically occur in riparian areas or the transition zone between riparian and upland. Typical unit is 20 acres.

**Before Situation:**

Area is in the early-to-mid phases of undesired woody species encroachment that degrades riparian condition, rangeland health, productivity, habitat for desired wildlife species. If woody species are allowed to expand, future degradation of ecological site condition results in loss of key forage/browse species, habitat loss for species of concern, increased noxious and invasive species, increased soil erosion, and altered hydrologic regimes.

**After Situation:**

Encroaching woody species are cut and/or removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site degradation is reversed and condition continues progressing in an upward trend. Desired hydrology, wildlife habitat, and plant health, vigor, and productivity are sustained.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $19,810.68

**Scenario Cost/Unit:** $990.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 160 | $686.40 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 25 | $534.75 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 80 | $6,926.40 |
| Chemical, precision application | 949 | Chemical application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $9.67 | 160 | $1,547.20 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 30 | $832.80 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 28 | $141.96 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 170 | $4,828.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 24 | $2,711.28 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 20 | $377.40 |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $44.20 | 20 | $884.00 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 20 | $26.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 314 - Brush Management

**Scenario** #301 - Invasive Conifer Tree Girdling

**Scenario Description:**

Conifer trees, such as Douglas-fir, have displaced the original native grassland plant community. Girdled conifer trees will be retained on site as standing dead trees (snags). Treatments will restore and improve available grazing forge, wildlife habitat, rangeland/grassland composition, and rangeland health.

**Before Situation:**

Lack of regular fire disturbance has resulted in native grasslands and meadows to be invaded by conifer trees at variable rates (20-300 trees/ac). If left untreated, the stand will eventually transition to a conifer forest type, diminishing the grassland resource values. The historical grassland condition was more open, lacking continuous conifer tree presence. The current condition is characterized by relatively small inclusions of invading conifer trees in formerly native grasslands. Invading trees vary in age and size but are often comprised of many small, less than 10 inch DBH trees. The defining characteristic of invading, native conifers, is that they are younger and have little competition which allows rapid growth and expansion of the conifer forest footprint in grasslands. This condition is negatively affecting grassland composition by causing declines in grazing forage, suppression of understory plants, and eventual loss of biodiversity needed to meet the landowner's objectives for improved grazing forage, wildlife habitat and rangeland health.

**After Situation:**

Conifer trees are girdled resulting in tree mortality. Trees are left as standing as dead conifer snags and are providing additional wildlife habitat.

**Feature Measure:** Number of Trees Girdled

**Scenario Unit::** Each

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,163.97

**Scenario Cost/Unit:** $11.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 33 | $141.57 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 36 | $1,022.40 |

**Practice:** 315 - Herbaceous Weed Treatment

**Scenario** #1 - Hand Tools

**Scenario Description:**

Using hand tools, such as shovels, hoes, nippers, to remove or cut off herbaceous plants at of below the root collar. Typical area has herbaceous weed species that are in the early phases of invasions. Typical unit is 10 acres.

**Before Situation:**

Area is in the very early phases of herbaceous weed encroachment that degrades habitat for desired wildlife species. Future degradation of key forage species and ecological site condition promoting noxious and invasive species and increased soil erosion if woody species are allowed to expand.

**After Situation:**

Herbaceous weeds are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition continues to progressing in an upward trend, hydrology and plant health and vigor are sustained.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,714.88

**Scenario Cost/Unit:** $371.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 32 | $684.48 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 32 | $888.32 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 64 | $324.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 64 | $1,817.60 |

**Practice:** 315 - Herbaceous Weed Treatment

**Scenario** #2 - Mechanical

**Scenario Description:**

Removal of herbaceous weeds of light infestations. The practice entails the removal of herbaceous weeds by the use of mower, brush hog, or other light equipment in order to reduce fuel loading and improve ecological site condition. Weeds have exceeded desired levels based on ecological site potential. Typical unit is 40 acres.

**Before Situation:**

Area consist of excessive stands of herbaceous weeds degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:**

Herbaceous weeds are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $4,025.19

**Scenario Cost/Unit:** $100.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 36 | $1,834.56 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 36 | $875.52 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 36 | $976.32 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 315 - Herbaceous Weed Treatment

**Scenario** #3 - Chemical, Spot Treatment

**Scenario Description:**

Land unit on which weed control using would be beneficial in order to accomplish objects such as: set back the plant community succession, improve the ecological condition, control invasive plants or improve forage conditions for domestic livestock or wildlife. The practice entails the eradication of vegetation by use of weed treatment, either initial or retreatment using equipment (such as a backpack, hand-sprayer or ATV-mounted wand) to apply chemicals, in order to eliminate noxious weeds, promote forage productivity, and improve ecological condition.

**Before Situation:**

Area consists of excessive stands of herbaceous plants degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:**

Herbaceous plants are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology or plant health and vigor is returning to near normal levels, and wildlife habitat is improved.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,219.55

**Scenario Cost/Unit:** $221.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 5 | $106.95 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 20 | $1,274.20 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 20 | $555.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 10 | $188.70 |

**Practice:** 315 - Herbaceous Weed Treatment

**Scenario** #7 - High Cost Chemical

**Scenario Description:**

Apply herbaceous weed management through the use of broadcast application of herbicide to reduce or remove undesirable species of brush. A low cost chemical will not adequately address the resource concern(s), so a high cost chemical will need to be used. Typical unit is 160 acres.

**Before Situation:**

Area consists of excessive stands of undesirable herbaceous plants degrading health and vigor of desirable plant species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:**

Undesirable herbaceous plants are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology or plant health and vigor is returning to near normal levels, and wildlife habitat is improved.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 160.0

**Scenario Total Cost:** $7,612.17

**Scenario Cost/Unit:** $47.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 160 | $963.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 160 | $6,052.80 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 160 | $209.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 315 - Herbaceous Weed Treatment

**Scenario** #8 - Two Treatments

**Scenario Description:**

The practice entails the control of undesirable herbaceous vegetation by treating it twice during the treatment period in order to improve ecological site condition. The target species can be treated with the same method twice, or by a combination of methods. Weedy vegetation needs to be treated at least twice in order to fully control it. Generally, the second treatment will kill resprouting stems or those which survived the first treatment or newly sprouted seedlings. Undesirable species density has exceeded desired levels based on ecological site potential. Typical unit is 120 acres. The practice is not completed until both treatments are completed.

**Before Situation:**

Area has excessive stands of undesirable species degrading health and vigor of desirable species promoting noxious and invasive species and degrading wildlife habitat such as riparian areas and native grasslands.

**After Situation:**

Undesirable herbaceous species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $18,454.38

**Scenario Cost/Unit:** $153.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 120 | $6,115.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 120 | $722.40 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 120 | $2,918.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 120 | $3,254.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 120 | $4,539.60 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 120 | $157.20 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 315 - Herbaceous Weed Treatment

**Scenario** #9 - Three Treatments

**Scenario Description:**

The practice entails the control of undesirable herbaceous vegetation by treating it three times during the treatment period in order to improve ecological site condition. The target species can be treated with the same method all three times, or by a combination of methods. Weedy vegetation needs to be treated at least three times in order to fully control it. Generally, the second and third treatments will kill resprouting stems, persistent vegetation, or newly sprouted seedlings. Undesirable species density has exceeded desired levels based on ecological site potential. Typical unit is 120 acres. The practice is not completed until all treatments are completed.

**Before Situation:**

Area has excessive stands of undesirable species degrading health and vigor of desirable species promoting noxious and invasive species and degrading wildlife habitat such as riparian areas and native grasslands.

**After Situation:**

Undesirable herbaceous species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $24,247.17

**Scenario Cost/Unit:** $202.06

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 9 | $192.51 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 120 | $6,115.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 240 | $1,444.80 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 120 | $2,918.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 120 | $3,254.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 9 | $425.25 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 240 | $9,079.20 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 240 | $314.40 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 3 | $503.01 |

**Practice:** 315 - Herbaceous Weed Treatment

**Scenario** #10 - Complex, Chemical Control

**Scenario Description:**

Persistent Perennial Invasive - Chemical Control such as Arundo donax, Lepidium latifolium or other persistent perennial invasive (i.e. purple loosestrife) involves chemical treatment only, leaving dead stalks in place. Acres planned need to reflect actual area treated. Particular attention should be given to O&M with potential follow-up chemical treatments as needed when regrowth sprouting occurs. Resource Concerns: Habitat Degradation, Degraded Plant Condition, and Water Quantity.

**Before Situation:**

Stream corridors are impacted due increased density of Arundo donax and Lepidium latifolia or other persistent perennial invasive involves. Stream flow is inhibited due to excess vegetation. Habitat for plants and animals is degraded.

**After Situation:**

Arundo donax is controlled with chemical treatment. O&M Plan includes follow-up chemical spraying as needed to control resprouting. Plant community has improved, stream flows are less impeded, and fish and wildlife habitats are improved.

**Feature Measure:** Acres of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $955.32

**Scenario Cost/Unit:** $955.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 8 | $509.68 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 1 | $27.76 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 4 | $156.24 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 2 | $75.66 |
| Herbicide, Glyphosate-ipa salt 4SL | 346 | Product is typically used for aquatic usage. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $6.12 | 2 | $12.24 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 2 | $2.62 |

**Practice:** 315 - Herbaceous Weed Treatment

**Scenario** #13 - Biological Control - Insects

**Scenario Description:**

Management of invasive, noxious, or prohibited plant species through the establishment of populations of species specific biological control insect agents released into the target plant population, or the collection and transfer of agents from one unit to another. Typical area is at least five acres of open rangeland or pasture, level to steeply sloping, on shallow to deep soils, and may include both upland and lowland sites.

**Before Situation:**

The noxious and invasive herbaceous species is naturalized on the unit, is not suitable for the intended use, is competing for establishment, water and nutrients with suitable plant species, and has negatively impacted ecologic functions at the site. Suitable vegetation for the intended use is in low vigor with limited reproductive capability diminishing available forage for livestock. Changes in plant community composition and structure have resulted in degraded wildlife habitat. The site is at risk of increased soil erosion and further degradation by invasive or noxious species.

**After Situation:**

An established population of biological control insect agents reduces seed production, competitiveness, and populations of the target invasive plant species. Health and vigor of desirable vegetation increases as a result of reduced competition and proper management. Wildlife habitat and forage values return to the site, ecologic functions improve and conditions trend upward. The risk of increased soil erosion and further degradation of the site have been reduced.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $572.14

**Scenario Cost/Unit:** $114.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 2 | $55.52 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Stem Gall Fly (Urophora cardui) | 302 | Stem Gal Fly. Includes all support necessary to ensure adequate release of insects. Labor not included. Includes materials and shipping only. | Each | $0.93 | 100 | $93.00 |
| Stem Mining Weevil (Ceutorhynchus litura) | 303 | Stem Mining Weevil. Includes all support necessary to ensure adequate release of insects. Labor not included. Includes materials and shipping only. | Each | $1.58 | 100 | $158.00 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #2 - Static pile, Concrete Pad

**Scenario Description:**

This scenario consists of installing a concrete pad over permeable soils, karst topography, frequently accessed sites or sites with regulatory requirements. Typically associated with large dairy (1,000 cows plus heifers ) or beef animal mortality with an average daily mortality of 175 lbs/day. Area sized to compost animal mortality as a static pile or windrow with equipment around materials. Sufficient carbon based bulking material added to allow natural aeration and a proper C:N ratio. Piles typically turned at least once to go into another heat cycle prior to final disposal, typically land application. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Concrete apron or approach should be contracted under Waste Transfer or Heavy Use Area Protection. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Diversion (362), Subsurface Drain (606), Underground Outlet (620), Heavy Use Area Protection (561), Waste Transfer (634)

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Construct a 60'x95' concrete surface to process mortality. Concrete 6" thick with reinforcement, curbs or speed bumps are installed on all sides. Typical layout is 18' wide piles with 8' wide access area is around each pile or windrow. Site preparation includes topsoil removal, minimal regrading and compaction, installing gravel or sand subbase and then concrete.

**Feature Measure:** Area of pad

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 5,700.0

**Scenario Total Cost:** $35,392.44

**Scenario Cost/Unit:** $6.21

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 113.5 | $31,890.10 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 215 | $496.65 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 105.5 | $3,005.70 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #3 - Static pile, Wood Bin(s)

**Scenario Description:**

This scenario consists of installing a group of small bins along one side and a long narrow bin on the backside of a concrete pad to compost poultry or small swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed with Roofs and Covers (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Organic sites will require more frequent replacement of lumber. Concrete apron or approach should be contracted under Waste Transfer or Heavy Use Area Protection. Potential Associated Practices: Roofs and Covers (367), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), and Underground Outlet (620), Heavy Use Area Protection (561), Waste Transfer (634)

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excess nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Install a 20' wide by 40' long pad with three bins (4-20' long walls perpendicular to a 40' main wall) each with 4' high walls and one end open. Total wall length = 120'. Inside storage capacity is 3 bins X (12.4' wide X 19.3' long X 4' high) = 2872 cf. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 6" of gravel, installing concrete slab and 1' high concrete curb, and installing 4' high (3' above curb) wood walls. Typical walls consist of 2" X 6" slats supported by 6" X 6" posts (5.5' long average length of 8' long posts buried 4' deep and 3' long posts set atop concrete curb). Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application.

**Feature Measure:** Bin capacity (cubic feet)

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 2,880.0

**Scenario Total Cost:** $11,969.44

**Scenario Cost/Unit:** $4.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 22 | $6,181.34 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 3 | $1,310.97 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 30 | $69.30 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 15 | $427.35 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 720 | $691.20 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.76 | 578 | $1,017.28 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #4 - Static pile, Concrete Bin(s)

**Scenario Description:**

This scenario consists of installing two or more concrete bins, open on one end on a concrete pad to compost larger quantities of poultry or mature swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. This scenario is to be used when site restrictions such as wall height, available space, roof type/layout or other site features are not appropriate for the use of concrete block walls. The roofed portion of the facility is addressed in Cover and Roofs (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Concrete apron or approach should be contracted under Waste Transfer or Heavy Use Area Protection. Potential Associated Practices: Roofs and Cover ( 367 ), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), Underground Outlet (620), Waste Transfer (634)

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excess nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Install a 20' wide by 48' long pad with four bins (5-20' long walls perpendicular to a 48' main wall) each with 4' high walls and one end open. Inside storage capacity is 4 bins X (10.8' wide X 18.7' long X 4' high) = 3231 cf. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 6" of gravel, installing concrete slab and installing 4' high concrete cast-in-place walls. Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application.

**Feature Measure:** Volumetric storage capacity

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 3,230.0

**Scenario Total Cost:** $12,146.15

**Scenario Cost/Unit:** $3.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 24 | $6,743.28 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 11 | $4,806.89 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 36 | $83.16 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 18 | $512.82 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #5 - Static pile, Precast Block

**Scenario Description:**

This scenario consists of installing a concrete bin with 4' high ecology block walls, open on one end on a concrete pad to compost larger quantities of poultry or mature swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed in Cover and Roofs (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Concrete apron or approach should be contracted under Waste Transfer or Heavy Use Area Protection. Potential Associated Practices: Roofs and Cover ( 367 ), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), Underground Outlet (620), Waste Transfer (634)

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excess nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Install a 20' wide by 48' long pad with three 17'L X 12.7'W X 4'H bins with precast ecology block walls. The total capacity volume is 3 bins X (17' X 12.7' X 4') = 2,591 cf. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 6" of gravel, installing 6" concrete slab and installing 4' high precast ecology bock walls with curb behind the external walls. Curb length = 20' + 20' + 48' = 88'. Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application.

**Feature Measure:** Storage capacity in cubic feet

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 2,600.0

**Scenario Total Cost:** $12,615.46

**Scenario Cost/Unit:** $4.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 29 | $8,148.13 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 36 | $83.16 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 18 | $512.82 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $110.61 | 35 | $3,871.35 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #6 - Static pile, Precast Block, Remote location

**Scenario Description:**

This scenario consists of installing a concrete bin with 4' high ecology block walls, open on one end on a concrete pad to compost larger quantities of poultry or mature swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. The facility's site is greater than 30 miles from the nearest certified concrete batch plant. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed in Cover and Roofs (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Concrete apron or approach should be contracted under Waste Transfer or Heavy Use Area Protection. Potential Associated Practices: Roofs and Cover ( 367 ), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), Underground Outlet (620), Waste Transfer (634)

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excess nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Install a 20' wide by 48' long pad with three 17'L X 12.7'W X 4'H bins with precast ecology block walls. The total capacity volume is 3 bins X (17' X 12.7' X 4') = 2,591 cf. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 6" of gravel, installing 6" concrete slab and installing 4' high precast ecology bock walls with curb behind the external walls. Curb length = 20' + 20' + 48' = 88'. Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application.

**Feature Measure:** Storage capacity in cubic feet

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 2,600.0

**Scenario Total Cost:** $14,655.46

**Scenario Cost/Unit:** $5.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 29 | $8,148.13 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 36 | $83.16 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 18 | $512.82 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $110.61 | 35 | $3,871.35 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 2000 | $2,040.00 |

**Practice:** 317 - Composting Facility

**Scenario** #5 - Compost Pad, Concrete floor, No walls

**Scenario Description:**

This scenario consists of a compost facility with a reinforced concrete floor without side walls. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. This scenario is required when a slab is designated as water tight or when the subgrade requires steel reinforcing. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical is 1,600 SqFt (40'x40'). The site floor will be prepared by stripping the top 1' of soil as needed, placing 6" of a sand/gravel base and pouring a 6" reinforced concrete slab with 1' X 0.67' X 160' curb (all four sides). Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1,600.0

**Scenario Total Cost:** $10,534.88

**Scenario Cost/Unit:** $6.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 34 | $9,552.98 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 60 | $138.60 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 30 | $843.30 |

**Practice:** 317 - Composting Facility

**Scenario** #6 - Compost Pad, Concrete floor, Wood walls

**Scenario Description:**

This scenario consists of a compost facility with a concrete floor with wood side walls. This scenario is intended for sites where wall height restrictions, available space, roof type/layout or other site features do not allow for the use of concrete walls. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and groundwater. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Install a 20' wide by 40' long pad with three bins (4-20' long walls perpendicular to a 40' main wall) each with 4' high walls and one end open. Inside storage capacity is 3 bins X (12.4' wide X 19.3' long X 4' high) = 2872 cf. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 6" of gravel, installing concrete slab and 1' high concrete curb, and installing 4' high (3' above curb) wood walls. Typical walls consist of 2" X 6" slats supported by 6" X 6" posts (5.5' long average length of 8' long posts buried 4' deep and 3' long posts set atop concrete curb). Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application.

**Feature Measure:** Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 2,900.0

**Scenario Total Cost:** $10,652.77

**Scenario Cost/Unit:** $3.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 22 | $6,181.34 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 30 | $69.30 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 15 | $421.65 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 720 | $691.20 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.76 | 578 | $1,017.28 |

**Practice:** 317 - Composting Facility

**Scenario** #7 - Compost Pad, large, concrete floor and concrete walls

**Scenario Description:**

This scenario consists of a compost facility with a concrete floor and formed concrete side walls. This scenario is intended for sites that require the use of concrete walls due to roof loads or durability requirements. The availability of an experienced licensed contractor and/or its proximity to a certified concrete batching plant. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Install a 20' wide by 48' long pad with four bins (5-20' long walls perpendicular to a 48' main wall) each with 4' high walls and one end open. Inside storage capacity is 4 bins X (10.8' wide X 18.7' long X 4' high) = 3231 cf. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 6" of gravel, installing concrete slab and installing 4' high concrete cast-in-place walls. Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application.

**Feature Measure:** Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 3,250.0

**Scenario Total Cost:** $12,139.31

**Scenario Cost/Unit:** $3.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 24 | $6,743.28 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 11 | $4,806.89 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 36 | $83.16 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 18 | $505.98 |

**Practice:** 317 - Composting Facility

**Scenario** #8 - Compost Pad, concrete floor and precast concrete block walls

**Scenario Description:**

This scenario consists of a small compost facility with a concrete floor and formed concrete side walls. This scenario is intended for sites that require the use of concrete walls due to roof loads or durability requirements. The availability of an experienced licensed contractor and/or its proximity to a certified concrete batching plant. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Install a 20' wide by 48' long pad with three 17'L X 12.7'W X 4'H bins with precast ecology block walls. The total capacity volume is 3 bins X (17' X 12.7' X 4') = 2,591 cf. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 6" of gravel, installing 6" concrete slab and installing 4' high precast ecology bock walls with curb behind the external walls. Curb length = 20' + 20' + 48' = 88'. Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application.

**Feature Measure:** Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 2,600.0

**Scenario Total Cost:** $12,608.62

**Scenario Cost/Unit:** $4.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 29 | $8,148.13 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 36 | $83.16 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 18 | $505.98 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $110.61 | 35 | $3,871.35 |

**Practice:** 317 - Composting Facility

**Scenario** #9 - Compost Pad, concrete floor and precast concrete block walls, Remote location

**Scenario Description:**

This scenario consists of a small compost facility with a concrete floor and formed concrete block side walls. This scenario is intended for sites that require the use of concrete walls due to roof loads or durability requirements, and its proximity to a certified concrete batching plant is greater than 30 miles away. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excess nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Install a 20' wide by 48' long pad with three 17'L X 12.7'W X 4'H bins with precast ecology block walls. The total capacity volume is 3 bins X (17' X 12.7' X 4') = 2,591 cf. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 6" of gravel, installing 6" concrete slab and installing 4' high precast ecology bock walls with curb behind the external walls. Curb length = 20' + 20' + 48' = 88'. Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application.

**Feature Measure:** Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 2,600.0

**Scenario Total Cost:** $14,655.46

**Scenario Cost/Unit:** $5.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 29 | $8,148.13 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 36 | $83.16 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 18 | $512.82 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $110.61 | 35 | $3,871.35 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 2000 | $2,040.00 |

**Practice:** 319 - On-Farm Secondary Containment Facility

**Scenario** #1 - Double Wall Tank

**Scenario Description:**

This practice scenario includes the replacement of an existing single wall fuel storage tank with a new double wall tank. The purpose of the practice is to address resource concerns related to water quality degradation due to the excessive release of organics into ground and surface waters or excessive sediment and turbidity in surface waters. Associated practices: Heavy Use Area Protection (561).

**Before Situation:**

The agricultural operation has an existing single wall fuel/oil storage tank(s) without any spill prevention protection. The producer has developed an SPCC plan in accordance with EPA requirements, which requires an above ground secondary containment facility for on-farm oil products.

**After Situation:**

This scenario is based on the replacement of an existing single wall tank(s) with a new double wall tank(s). Installation of "used" double wall tank(s) will not be allowed. A 3000 gallon horizontal or vertical antiroll tank (U/L 142-23 Secondary Containment Vessel) double walled which meets EPA regulations will be installed. Payment Schedule is based on the cost difference between a new single wall tank and new double wall tank of the same size. The double wall tank will provide an environmentally safe facility for handling and storage of oil products stored on the farm. Any accidental spills will be contained.

**Feature Measure:** Tank volume

**Scenario Unit::** Gallon

**Scenario Typical Size:** 3,000.0

**Scenario Total Cost:** $4,057.81

**Scenario Cost/Unit:** $1.35

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $89.84 | 2 | $179.68 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 2 | $80.32 |
| **Materials** | | | | | | |
| Tank, storage tank, upgrade to a double wall from a single wall, horizontal, steel, above ground, variable cost portion | 2260 | Variable cost portion of the difference between a single wall and double wall horizontal steel storage tank. Includes cradles, coating, fittings, labor, equipment. Excludes foundations, pumps or piping. | Gallon | $0.98 | 3000 | $2,940.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 319 - On-Farm Secondary Containment Facility

**Scenario** #2 - Earthen Containment

**Scenario Description:**

This practice scenario includes the construction of an earthen containment wall with a flexible membrane liner around an existing storage tank. The containment will not have a roof. The purpose of the practice is to address resource concerns related to water quality degradation due to the excessive release of organics into ground and surface waters or excessive sediment and turbidity in surface waters. Associated practices: Heavy Use Area Protection (561).

**Before Situation:**

The agricultural operation has a single walled fuel/oil storage tank(s) without any spill prevention protection. The producer has developed an SPCC plan in accordance with EPA requirements, which requires an above ground secondary containment facility for on-farm oil products.

**After Situation:**

This scenario is based on containment for a 10,000 gallon tank. The containment will be lined with a flexible membrane liner. The containment volume is designed for 125% of the tank volume (10,000 gallons X 125% = 12,500 gallons). The bottom dimensions of the containment are 40 ft x 24 ft. The wall is 2.5 feet high with a 2 ft top width and 2:1 sideslopes. The total volume of earthfill = 114 CY. The flexible liner size = 1,872 SF. Tanks will be moved or raised to install base materials. Hauled in earthfill will be used to construct the dike. The flexible liner will be installed in conformance with the design and specifications. The completed structure will provide an environmentally safe facility for handling and storage of oil products stored on the farm. Any accidental spills will be contained.

**Feature Measure:** Cubic Yard of compacted earthen

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 114.0

**Scenario Total Cost:** $16,335.08

**Scenario Cost/Unit:** $143.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 126 | $550.62 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 114 | $409.26 |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $89.84 | 2 | $179.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 2 | $80.32 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 18 | $512.82 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.38 | 50 | $69.00 |
| Geotextile, non-woven, heavy weight | 1210 | Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $4.41 | 208 | $917.28 |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.50 | 1872 | $12,168.00 |
| Fuel Containment Facility, Gate valve 2 inch diameter | 1735 | Metal 2 inch diameter gate valve. Materials only. | Each | $291.12 | 1 | $291.12 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 319 - On-Farm Secondary Containment Facility

**Scenario** #3 - Corrugated Metal Wall Containment

**Scenario Description:**

This practice scenario includes the installation of a corrugated metal ring containment with a flexible membrane liner around an existing storage tank. The purpose of the practice is to address resource concerns related to water quality degradation due to the excessive release of organics into ground and surface waters or excessive sediment and turbidity in surface waters. Associated practices: Heavy Use Area Protection (561)

**Before Situation:**

The agricultural operation has a single walled fuel/oil storage tank(s) without any spill prevention protection. The producer has developed an SPCC plan in accordance with EPA requirements, which requires an above ground secondary containment facility for on-farm oil products.

**After Situation:**

This scenario is based on containment for a 10,000 gallon tank. The containment will be lined with a flexible membrane liner. The containment volume is designed for 125% of the tank volume (10,000 gallons X 125% = 12,500 gallons). The bottom dimensions of the containment are 26 ft x 24 ft. The corrugated panel wall is 2.75 feet high. The total area of wall = 275 SF. The flexible liner size = 930 SF. Tanks will be moved or raised to install base materials. The corrugated wall and flexible liner will be installed in conformance with the design and specifications. The completed structure will provide an environmentally safe facility for handling and storage of oil products stored on the farm. Any accidental spills will be contained.

**Feature Measure:** Square Ft of Corrugated Metal Wal

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 275.0

**Scenario Total Cost:** $8,351.63

**Scenario Cost/Unit:** $30.37

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formless, non reinforced | 36 | Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $138.47 | 1.5 | $207.71 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 35 | $152.95 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 2 | $223.32 |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $89.84 | 2 | $179.68 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 96 | $2,726.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 12 | $341.88 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.38 | 40 | $55.20 |
| Fuel Containment Facility, corrugated metal panel wall with membrane liner, variable cost portion | 1732 | Variable cost portion of a secondary fuel containment facility including metal panels, support posts and flexible liner. Materials only. | Square Foot | $2.89 | 275 | $794.75 |
| Fuel Containment Facility, Gate valve 2 inch diameter | 1735 | Metal 2 inch diameter gate valve. Materials only. | Each | $291.12 | 1 | $291.12 |
| Fuel Containment Facility, corrugated metal panel wall with membrane liner, fixed cost portion | 2061 | Fixed cost portion of a secondary fuel containment facility including metal panels, support posts and flexible liner. This portion is the base cost for the system. Materials only. | Each | $1,943.74 | 1 | $1,943.74 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 319 - On-Farm Secondary Containment Facility

**Scenario** #4 - Concrete Containment Wall

**Scenario Description:**

This practice scenario includes the installation of a reinforced concrete wall containment with a concrete slab around an existing storage tank. The purpose of the practice is to address resource concerns related to water quality degradation due to the excessive release of organics into ground and surface waters or excessive sediment and turbidity in surface waters. Due to topography, limited site space and/or geological conditions a fabricated structure is needed. Structure will provide an environmentally safe facility for handling and storage of these products. Associated practices may include: Heavy Use Area Protection (561).

**Before Situation:**

Existing agricultural operation that has single walled fuel/oil storage tank(s) not protected. The producer has developed an SPCC plan in accordance with EPA requirements, that requires an above ground secondary containment facility for on-farm oil products, in order to control the excessive release of organics into ground and surface waters, or to control the excessive sediment and turbidity in surface water.

**After Situation:**

This scenario is based on containment for a 4,700 gallon tank. The containment volume is designed for 125% of the tank volume (4,700 gallons X 125% = 5,875 gallons). Structure will provide an environmentally safe facility for handling and storage of these products. Typical containment dimensions are 196 sqft bottom x 6" thick slab with 6" thick x 4' tall formed sidewalls. Tanks will be moved or raised to install base materials. The fabricated containment structure will be installed in conformance with the design and specifications. The on-farm oil products stored on the farm have secondary containment of accidental release that controls the excessive release of organics, suspended sediments, and turbidity. Structure will provide an environmentally safe facility for handling and storage of these products.

**Feature Measure:** Volume of concrete in the wall

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $4,506.40

**Scenario Cost/Unit:** $1,126.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 4.2 | $1,180.07 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 4.3 | $1,879.06 |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $89.84 | 2 | $179.68 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 2 | $80.32 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 4.2 | $119.66 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.38 | 30 | $41.40 |
| Fuel Containment Facility, Gate valve 2 inch diameter | 1735 | Metal 2 inch diameter gate valve. Materials only. | Each | $291.12 | 1 | $291.12 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 319 - On-Farm Secondary Containment Facility

**Scenario** #5 - Modular Block Containment Wall

**Scenario Description:**

This practice scenario includes the installation of a modular block concrete wall containment with a flexible membrane liner over a 6" concrete floor. The purpose of the practice is to address resource concerns related to water quality degradation due to the excessive release of organics into ground and surface waters or excessive sediment and turbidity in surface waters. Due to topography, limited site space and/or geological conditions a fabricated structure is needed. Structure will provide an environmentally safe facility for handling and storage of these products. Associated practices may include: Heavy Use Area Protection (561),

**Before Situation:**

Existing agricultural operation that has single walled fuel/oil storage tank(s) without any spill prevention protection. The producer has developed an SPCC plan in accordance with EPA requirements, that requires an above ground secondary containment facility for on-farm oil products.

**After Situation:**

This scenario is based on containment for a 6,000 gallon tank. The containment volume is designed for 125% of the tank volume (6,000 gallons X 125% = 7,500 gallons). Structure will provide an environmentally safe facility for handling and storage of these products. The bottom dimensions of the containment are 26ft x 24ft. The 2ft x 2ft x 6ft modular blocks are stacked 2 high for a wall height of 4ft. The containment area is 624 sqft. The flexible liner size with a 2ft overlap and anchored at the top of the modular block is 1224 sf. Tanks will be moved or raised to install base materials. The fabricated containment structure will be installed in conformance with the design and specifications. The on-farm oil products stored on the farm have secondary containment of accidental release that controls the excessive release of organics, suspended sediments, and turbidity. Structure will provide an environmentally safe facility for handling and storage of these products.

**Feature Measure:** secondary containment area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 624.0

**Scenario Total Cost:** $18,543.41

**Scenario Cost/Unit:** $29.72

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 16 | $4,495.52 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 13 | $75.01 |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $89.84 | 2 | $179.68 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 2 | $80.32 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 13 | $365.43 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 12 | $341.88 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.38 | 30 | $41.40 |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.50 | 1224 | $7,956.00 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $110.61 | 36 | $3,981.96 |
| Fuel Containment Facility, Gate valve 2 inch diameter | 1735 | Metal 2 inch diameter gate valve. Materials only. | Each | $291.12 | 1 | $291.12 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 320 - Irrigation Canal or Lateral

**Scenario** #1 - Irrigation Canal

**Scenario Description:**

This scenario is the construction of an Irrigation Canal or Lateral. Typical construction dimensions are 4' wide bottom x 3' deep x 1320' length with a side slope of 2:1. Resource concerns: Excess/Insufficient Water - Inefficient Use of Irrigation Water. Associated Conservation Practices: 388-Irrigation Field Ditch; 443-Irrigation System, Surface or Subsurface; 533-Pumping Plant; 430-Irrigation Pipeline; 587 - Structure for Water Control; 449 - Irrigation Water Management

**Before Situation:**

Water supply for an area is inadequate for crop production and irrigation water application is inefficient.

**After Situation:**

An earthen canal that has adequate capacity to convey sufficient irrigation water to meet the demands of the system and make irrigation practical for the crops being grown.

**Feature Measure:** Volume of earth excavated

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,467.0

**Scenario Total Cost:** $3,724.11

**Scenario Cost/Unit:** $2.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 1467 | $3,388.77 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 324 - Deep Tillage

**Scenario** #3 - Deep Tillage less than 20 inches

**Scenario Description:**

Fields (80 acres) with adverse soils conditions that restrict plant growth such as compacted layers caused by tillage operations or restrictive layers such as hardpans (duripans) in the root zone. This practice does not apply to normal tillage practices to prepare a seedbed but is meant to fracture the restrictive soil layer.

**Before Situation:**

In this geographic area, crop plants are observed as having reduced yield, water is not infiltrating into the soil. Soil layers have been compacted by shallow tillage operations, or soils have a hardpan (duripan) layer that is restricting root growth. Typical field size is 80 acres with crop rotations consisting of annual row crops or small grains with conventional tillage or when the harvesting of row crops (onions, sugar beets, potato, corn silage) use heavy trucks to assist with the harvest. Compaction has been caused when soil moisture is to wet for normal field operations or by excessive shallow tillage or field harvest haul traffic throughout the entire field. Soil structure has been reduced, aggregate strength is week and soil biological activity is low. Soil organic matter is not adequate and the water holding capacity of the soil is limited for the desired root zone.

**After Situation:**

Soil compaction is measured with a penetrometer and visual observation of limiting root growth. Deep tillage operations such as subsoiling, paratilling or ripping are performed not as a part of the normal tillage operation for seedbed preparation, but used to relieve compaction at depths less than 20 inches. Soil moisture is less than 30 percent when deep tillage is used. The fractured zone will be sufficient to permit root penetration below the restrictive soil layer. Penetrometers are used to identify the severity (psi) of the compaction and the depth of the restrictive layer. Deep tillage is generally preformed in the fall after crop harvest when soil conditions are dry. After deep tillage, harvest operations should be avoided when soil moisture is greater than 50% of field capacity. Field harvest haul traffic should be limited to end rows or haul roads. Using dual tires or tracts beneath tractors or grain wagons can help spread the weight load.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $1,869.73

**Scenario Cost/Unit:** $23.37

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| Ripper or subsoiler, 16 to 36 inch depth | 1235 | Deep ripper or subsoiler, (16-36 inches depth) includes tillage implement, power unit and labor. | Acre | $19.57 | 80 | $1,565.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |

**Practice:** 324 - Deep Tillage

**Scenario** #4 - Deep Tillage more than 20 inches

**Scenario Description:**

Fields (80 acres) with adverse soils conditions that restrict plant growth such as compacted layers caused by tillage operations or restrictive layers such as hardpans (duripans) in the root zone. This practice does not apply to normal tillage practices to prepare a seedbed but is meant to fracture the restrictive soil layer.

**Before Situation:**

In this geographic area, crop plants are observed as having reduced yield, water is not infiltrating into the soil. Soil layers have been compacted by shallow tillage operations, or soils have a hardpan (duripan) layer that is restricting root growth. Typical field size is 80 acres with crop rotations consisting of annual row crops, orchard /vineyards or small grains with conventional tillage or when the harvesting of row crops (onions, sugar beets, potato, corn silage) use heavy trucks to assist with the harvest. Orchards and vineyards may be deep ripped prior to establishment of perennial crop. Compaction has been caused when soil moisture is to wet for normal field operations or by excessive shallow tillage or field harvest haul traffic throughout the entire field. Soil structure has been reduced, aggregate strength is week and soil biological activity is low. Soil organic matter is not adequate and the water holding capacity of the soil is limited for the desired root zone.

**After Situation:**

Soil compaction is measured with a penetrometer and visual observation of limiting root growth. Deep tillage operations such as subsoiling, paratilling or ripping are performed not as a part of the normal tillage operation for seedbed preparation, but used to relieve compaction at depths more than 20 inches. Soil moisture is less than 30 percent when deep tillage is used. The fractured zone will be sufficient to permit root penetration below the restrictive soil layer. Penetrometers are used to identify the severity (psi) of the compaction and the depth of the restrictive layer. Deep tillage is generally preformed in the fall after crop harvest when soil conditions are dry. When possible, harvest operations should be avoided when soil moisture is greater than 50% of field capacity. Field harvest haul traffic should be limited to end rows or haul roads. Using dual tires or tracts beneath tractors or grain wagons can help spread the weight load.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $5,058.53

**Scenario Cost/Unit:** $63.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| Ripper or subsoiler, > 36 inch depth | 1236 | Deep ripper or subsoiler, (>36 inches depth) includes tillage implement, power unit and labor. | Acre | $59.43 | 80 | $4,754.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |

**Practice:** 325 - High Tunnel System

**Scenario** #35 - Contiguous US

**Scenario Description:**

Used for contiguous US states in areas with low snowfall. A Quonset style (rounded) manufactured frame of tubular steel (30 x 72 ft.) covered with 4-year 6 mil plastic. Costs are based on purchase of manufactured kit and landowner installing the structure. Structure must be installed to manufacturer's specifications.

**Before Situation:**

Cropland where extension of the growing season is needed. Additional resource concerns that may need to be addressed include soil erosion, soil condition, water quality, water quantity, and plant condition.

**After Situation:**

A Quonset style high tunnel structure has been installed and the growing season has been extended for 1-4 months on average. Plant health and vigor has been improved.

**Feature Measure:** Area of Tunnel Installed

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,160.0

**Scenario Total Cost:** $8,993.20

**Scenario Cost/Unit:** $4.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 71 | $2,016.40 |
| **Materials** | | | | | | |
| Hoop House, quonset style, base package | 1277 | Includes the framework complete with all predrilled steel, hardware and instructions. Includes 6 mil 4-year polyethylene film to cover tunnel, and polylock for sides and ends for a quonset style (round top) hoop house. Materials and shipping only, does not include labor. | Square Foot | $3.23 | 2160 | $6,976.80 |

**Practice:** 326 - Clearing and Snagging

**Scenario** #2 - Rock Removal

**Scenario Description:**

Removal and disposal of rock debris, cobbles and small boulders from river or stream course impedes the proper functioning of a stream channel or water course to restore flow capacity; prevent bank erosion by eddies; reduce the formation of sediment bars; and/or minimize blockages by debris. This scenario is appropriate in setting that is easily accessible with tradition construction equipment. Associated practices may include 580 Streambank and Shoreline Protection, 584 Channel Stabilization and 342 Critical Area Planting

**Before Situation:**

Rock debris, cobbles and small boulders causes a flow restriction or divert flowing water against the streambank causing excess erosion or fish passage restrictions. Approximately two-thirds of the channel flow capacity is obstructed. The flow blockage may encourage deposition in the main channel and may alter the established flow channel.

**After Situation:**

Rock debris, cobbles and small boulder have been removed to allow unrestricted flow in the channel and appurtenant structures. Material that poses no blockage threat is left in place to enhance aquatic habitat. Channel bed and banks are in equilibrium with the flow. Typical scenario is for a project area that is along or immediately adjacent to a paved road. No special setup is required for excavating equipment. Construction would typically include specialized equipment such as excavators and loaders. The typical scenario is for a channel requiring 3 cy of rock removal per LF of channel on 50' of channel. Assumes material is moved from the site and disposed of at an adjacent site. Activities would include excavation of rock or boulder debris, off site disposal of materials and creation of a stable channel reach.

**Feature Measure:** Length of Channel Clearing

**Scenario Unit::** Foot

**Scenario Typical Size:** 125.0

**Scenario Total Cost:** $3,747.76

**Scenario Cost/Unit:** $29.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 8 | $1,291.52 |
| Track Loader, 95HP | 935 | Equipment and power unit costs. Labor not included. | Hour | $86.55 | 8 | $692.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 326 - Clearing and Snagging

**Scenario** #3 - Rock Removal, Offsite Disposal

**Scenario Description:**

Removal and disposal of rock debris, cobbles and small boulder on sites that require that the rock be hauled off site to a stable disposal area from river or stream course impedes the proper functioning of a stream channel or water course to restore flow capacity; prevent bank erosion by eddies; reduce the formation of sediment bars; and/or minimize blockages by debris. This scenario is appropriate in setting that is easily accessible with tradition construction equipment. Associated practices may include 580 Streambank and Shoreline Protection, 584 Channel Stabilization and 342 Critical Area Planting

**Before Situation:**

Rock debris, cobbles and small boulder provide a flow restriction or divert flowing water against the streambank causing excess erosion or fish passage restrictions on a site requiring removal of the debris to an off site location. Approximately two-thirds of the channel flow capacity is obstructed. The flow blockage may encourage deposition in the main channel and may alter the established flow channel.

**After Situation:**

Rock debris, cobbles and small boulder have been removed and disposed of offsite to allow unrestricted flow in the channel and appurtenant structures. Material that poses no blockage threat is left in place to enhance aquatic habitat. Channel bed and banks are in equilibrium with the flow. Typical scenario is for a project area that requires removal of the rock and debris to an off site location. No special setup is required for excavating equipment. Construction would typically include specialized equipment such as cranes, track hoes haul trucks. The typical scenario is for a channel requiring 3 cy of rock removal per LF of channel on 125' of channel. Assumes material is loaded into a dump truck and hauled 5 mile off site for disposal. Activities would include excavation of rock or boulder debris, off site disposal of materials and creation of a stable channel reach.

**Feature Measure:** Length of Channel Clearing

**Scenario Unit::** Foot

**Scenario Typical Size:** 125.0

**Scenario Total Cost:** $6,092.40

**Scenario Cost/Unit:** $48.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 8 | $1,291.52 |
| Track Loader, 95HP | 935 | Equipment and power unit costs. Labor not included. | Hour | $86.55 | 8 | $692.40 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $119.42 | 16 | $1,910.72 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 32 | $867.84 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 326 - Clearing and Snagging

**Scenario** #4 - Boulder and Concrete Structure Removal

**Scenario Description:**

Drilling, blasting, removal and disposal of boulders from river or stream course that require blasting or similar method on sites where the structures impedes the proper functioning of a stream channel or water course to restore flow capacity; prevent bank erosion by eddies; reduce the formation of sediment bars; and/or minimize blockages by debris. This scenario is appropriate for sites that are very difficult to access with tradition construction equipment and require blasting of rock or concrete structures prior to removal. Associated practices may include 580 Streambank and Shoreline Protection, 584 Channel Stabilization and 342 Critical Area Planting

**Before Situation:**

Large boulders and/or a concrete structure provides a flow restriction or divert flowing water against the streambank causing excess erosion or fish passage restrictions. Approximately two-thirds of the channel flow capacity is obstructed. The flow blockage may encourage deposition in the main channel and may alter the established flow channel. Structure or rock cannot be removed with standard equipment and requires blasting or similar measures before removing.

**After Situation:**

Large boulders or large concrete in stream structures have been removed to allow unrestricted flow in the channel and appurtenant structures. Material that poses no blockage threat is left in place to enhance aquatic habitat. Channel bed and banks are in equilibrium with the flow. Typical scenario is for a project area that is difficult to access and not near a paved road. Construction would typically require blasting of the structure or rock and would include specialized equipment such as excavators, track hoes haul trucks. The typical scenario is for a channel requiring 4 cy of rock removal per LF of channel on 200' of channel. Assumes material is moved from the site and disposed of at an approved disposal site 5 miles away. Activities would include blasting of instream material, excavation of concrete or boulder debris, off site disposal of materials and creation of a stable channel reach.

**Feature Measure:** Length of Channel Clearing

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $12,352.12

**Scenario Cost/Unit:** $61.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 8 | $519.36 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 20 | $3,228.80 |
| Track Loader, 95HP | 935 | Equipment and power unit costs. Labor not included. | Hour | $86.55 | 16 | $1,384.80 |
| Drilling & Blasting Rock, Open Face. | 1396 | Open Face drilling & blasting of rock (typically a min. 225 CY, Max 1500 CY). Includes all equipment, labor and supplies to complete the blast. | Cubic Yard | $14.70 | 200 | $2,940.00 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 4000 | $1,280.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 44 | $1,193.28 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 3 | $1,427.88 |

**Practice:** 326 - Clearing and Snagging

**Scenario** #5 - Instream Structure Removal

**Scenario Description:**

Removal and disposal of an instream structure (culvert, hardened instream crossing, etc.) that is currently causing impairment to fish and/or aquatic organism passage and/or impedes the proper functioning of a stream channel or water course to restore flow capacity; prevent bank erosion by eddies; reduce the formation of sediment bars. Structure is part of single land gravel surfaced forest or farm road. The structure and associated fill is removed and hauled off site to an appropriate off site disposal location. Typical structure to be removed is a 36" cmp, 50 ft long, placed in stream with bankfull width of 18 ft. Typical structure height is 10 ft. Project area is difficult to access and generally not near a paved road. Activities would include excavation of rock or boulder debris, off site disposal of materials and creation of a stable channel reach. Associated practices may include 580 Streambank and Shoreline Protection, 584 Channel Stabilization and 342 Critical Area Planting.

**Before Situation:**

Culverts, rock debris, cobbles and small boulder provide a flow restriction or divert flowing water against the streambank causing excess erosion or fish passage restrictions. Approximately two-thirds of the channel flow capacity is obstructed. The flow blockage may encourage deposition in the main channel and may alter the established flow channel. In this stream reach the structure/material is creating sub-optimal habitat for fish, aquatic insects and/or other stream species.

**After Situation:**

Artificial structure and associated fill removed, allowing unrestricted flow and natural stream channel forming processes to continue. Channel bed and banks are in equilibrium with the flow. The stream reach has improved habitat connectivity for desired species as determined by the NRCS Stream Visual Assessment (SVAP2) or equivalent assessment. Material that poses no blockage threat may be left in place to enhance aquatic habitat. Scenario size is Structure height (including fill) X stream bankfull width X structure length = 10' X 18' x 50' = 9000cf=333 cy.

**Feature Measure:** Volume of material removed

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 333.0

**Scenario Total Cost:** $7,765.72

**Scenario Cost/Unit:** $23.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 14 | $2,260.16 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 28 | $2,658.60 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 42 | $1,139.04 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 16 | $756.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 326 - Clearing and Snagging

**Scenario** #6 - Debris Plug Removal

**Scenario Description:**

Removal of a large sediment or debris plug from river or stream course that impedes the proper functioning of a stream channel or water course to restore flow capacity; prevent bank erosion by eddies; reduce the formation of sediment bars; and/or minimize blockages by debris. Associated practices may include 580 Streambank and Shoreline Protection, 584 Channel Stabilization and 342 Critical Area Planting

**Before Situation:**

Sediment, gravel or wood provide a flow restriction or divert flowing water against the streambank causing excess erosion or fish passage restrictions. The full channel prism is obstructed. The flow blockage may encourage deposition in the main channel and may alter the established flow channel.

**After Situation:**

Sediment, gravel and wood debris have been removed to allow unrestricted flow in the channel and appurtenant structures. Material that poses no blockage threat is left in place to enhance aquatic habitat. Channel bed and banks are in equilibrium with the flow. Typical scenario is for a project area that is relatively easy to access. Construction would typically include specialized equipment such as excavators, track hoes haul trucks. The typical scenario is for a channel requiring 1 cy of rock removal per LF of channel on 50' of channel. Assumes material is removed from the channel and disposed of at an adjacent site.

**Feature Measure:** Length of Debris Plug(s) in Channel

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,230.20

**Scenario Cost/Unit:** $24.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 4 | $645.76 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4 | $108.48 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 326 - Clearing and Snagging

**Scenario** #7 - Fence Removal and Disposal

**Scenario Description:**

Remove and disposal of all existing fences in a stream channel by demolition, excavation or other means required for removal. Dispose of all fence materials from the site so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all materials by removal to an approved landfill, wood chipping and land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Fence removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment and reduce hazards to wildlife.

**Before Situation:**

In stream channels where existing fence causes a flow restriction or divert flowing water against the streambank causing excess erosion or fish passage restrictions or interferes with the intended use of the reach.

**After Situation:**

The typical fence will be 200 linear feet. The removal of the fence will be performed with the use of equipment and hand labor. Dispose of all debris from the fence removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $732.05

**Scenario Cost/Unit:** $3.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 4 | $175.12 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4 | $108.48 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 327 - Conservation Cover

**Scenario** #1 - Introduced Species

**Scenario Description:**

The land is covered with permanent non-native grass vegetation resulting in reduced soil erosion and water/sediment runoff, and the elimination of dust emissions which improves air quality significantly. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings. Applies to conventional or organic systems.

**Before Situation:**

Crops such as corn, soybeans, or cotton may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Soil erosion exceed allowable tolerance, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

**After Situation:**

The 327 Implementation Requirements have been developed for the site and applied. The land is covered with permanent non-native grass vegetation resulting in reduced soil erosion and water/sediment runoff, and the elimination of significant dust emissions which improves air quality. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $6,501.00

**Scenario Cost/Unit:** $130.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 150 | $1,641.00 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 50 | $325.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 50 | $1,008.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 50 | $1,048.50 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 2000 | $900.00 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.57 | 50 | $1,578.50 |

**Practice:** 327 - Conservation Cover

**Scenario** #2 - Native Species

**Scenario Description:**

This practice applies on land to be retired from agricultural production and on other lands needing permanent protective cover. This practice typically involves conversion from a clean-tilled (conventional tilled) intensive cropping system to permanent native vegetation (scenario includes native grass). The typical size of the practice is 50 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts. Applies to conventional or organic systems

**Before Situation:**

Crops such as corn, soybeans, or cotton may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Soil erosion exceeds allowable tolerance, and sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

**After Situation:**

The 327 Implementation Requirements have been developed for the site and applied. The land is covered with permanent native grass vegetation which reduces soil erosion and water/sediment runoff, and eliminates dust emissions which improves air quality. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $9,268.00

**Scenario Cost/Unit:** $185.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 150 | $1,641.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 100 | $2,016.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 50 | $1,048.50 |
| **Materials** | | | | | | |
| Two Species Mix, Warm Season, Native Perennial Grass | 2325 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $91.25 | 50 | $4,562.50 |

**Practice:** 327 - Conservation Cover

**Scenario** #3 - Orchard or Vineyard Alleyways

**Scenario Description:**

This practice applies on orchards and vineyards needing permanent protective cover in the alleyways between tree and vine rows. The typical size of this practice is 20 acres. This practice typically involves conversion from a clean-tilled (conventional tilled) intensive cropping system to permanent vegetation (scenario includes non-native grass and legume mix). This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, enhance wildlife and/or pollinator habitat, manage plant pests, and reduce air quality impacts. Typically 60% of the surface area is conservation cover per acre.

**Before Situation:**

Orchard or vineyard with bare soil between vine/tree rows. Bare soil is exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter sediment/nutrient runoff from orchards/vineyards increases. Soil erosion exceeds tolerable levels. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of long periods of bare soil. Little to no wildlife/pollinator habitat is present.

**After Situation:**

The 327 Implementation Requirements have been developed for the site and has been applied. Orchard or Vineyard area between vine/tree rows are planted with permanent introduced grass/legume mix. Area covered has reduced soil erosion, reduced water/sediment runoff, and improved air quality as a result of the elimination of significant amounts of dust emissions.. Plants sown for conservation cover may provide cover for beneficial insects, pollinators, and wildlife.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $1,862.88

**Scenario Cost/Unit:** $93.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 24 | $262.56 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 12 | $78.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 24 | $483.84 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 12 | $251.64 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 480 | $216.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 480 | $192.00 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.57 | 12 | $378.84 |

**Practice:** 327 - Conservation Cover

**Scenario** #4 - Pollinator Species

**Scenario Description:**

Permanent vegetation, including a mix of native grasses, legumes, and forbs (mix may also include non-native species), established on any land needing permanent vegetative cover that provides habitat for pollinators. Typical practice size is variable depending on site; this scenario uses 1 ac as the typical size. In addition to providing pollinator habitat, this practice scenario may also reduce sheet, rill, and wind erosion, improve soil quality, improve water quality, and improve air quality. The practice may also provide wildlife habitat. Practice applicable on cropland, odd areas, corners, etc. Applies to conventional or organic systems.

**Before Situation:**

Crops such as corn, soybeans, or cotton may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Erosion exceeds tolerable rates and sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife or pollinator habitat.

**After Situation:**

The 327 Implementation Requirements have been developed for the site and applied. Land is covered with permanent pollinator habitat including a mix of native grasses, legumes, forbs (mix may also include non-native species). This practice may also have reduced soil erosion, reduced water/sediment runoff, and improved air quality as a result of the elimination of dust emissions. Plants sown for pollinator habitat may also provide cover for beneficial insects and wildlife. This scenario does not apply to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,046.12

**Scenario Cost/Unit:** $1,046.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 3 | $32.82 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 2 | $40.32 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Materials** | | | | | | |
| Six Species Mix, Native Forb | 2334 | Native forb mix. Includes material and shipping only. | Acre | $952.01 | 1 | $952.01 |

**Practice:** 327 - Conservation Cover

**Scenario** #22 - Monarch Species Mix

**Scenario Description:**

Establish permanent vegetative cover for pollinator habitat according to state specifications. Typically used for high quality nectar and pollen species. Assumes seed/plugs, equipment and labor for seed bed prep/planting, and weed management during establishment. Used for conventional or organic land on small, intensive areas that are central to specialty crop production. Not typically used for large-scale plantings. This is applicable to both organic and non-organic conditions.

**Before Situation:**

Old hayfields that are mowed typically in the fall lack milkweed needed for monarchs. Other crops such as corn, soybeans, or cotton are conventionally grown and harvested. The system provides little to no wildlife or pollinator habitat.

**After Situation:**

The 327 Implementation Requirements have been developed and applied for the site. Land covered with permanent monarch habitat including a mix of milkweed species, native grasses, legumes, and forbs. Plants sown for monarch habitat may also provide cover for beneficial insects and wildlife.

**Feature Measure:** area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,479.70

**Scenario Cost/Unit:** $1,479.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 3 | $32.82 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 2 | $40.32 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Materials** | | | | | | |
| Specialized native grass and forb mix | 2619 | A mix of native grass and forbs to be used for specialized purposes such as wildlife (including pollinators) or ecosystem restoration, requiring species not readility available and/or difficult to produce and harvest. Includes material and shipping only | Acre | $989.71 | 1.4 | $1,385.59 |

**Practice:** 327 - Conservation Cover

**Scenario** #27 - Introduced with Forgone Income

**Scenario Description:**

This practice applies on organically managed land needing permanent protective cover. This practice typically involves conversion from an intensive organic cropping system to permanent non-native vegetation (scenario includes non-native grass/legume mix). The typical size of the practice is 20 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts.

**Before Situation:**

Crops such as vegetables and small fruit crops are organically grown and harvested. Full width tillage is utilized, weeds controlled mainly by cultivation. Soil surface residue amounts average 10% or less. Erosion exceeds tolerable rates and sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

**After Situation:**

The 327 Implementation Requirements have been developed for the site and has been applied. Organically managed land covered with permanent non- native grass/legume mix vegetation has reduced soil erosion, reduced water/sediment runoff, and improved air quality due to the elimination of dust emissions. . Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $16,662.25

**Scenario Cost/Unit:** $333.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 150 | $1,641.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 50 | $1,008.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 50 | $1,048.50 |
| **Foregone Income** | | | | | | |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 25 | $4,995.50 |
| FI, Oats Dryland | 1969 | Dryland Oats is Primary Crop | Acre | $221.43 | 25 | $5,535.75 |
| **Materials** | | | | | | |
| Nitrogen, Organic | 266 | ORGANIC Nitrogen | Pound | $0.19 | 2500 | $475.00 |
| Phosphorus, Organic | 267 | ORGANIC Phosphorus | Pound | $0.19 | 2000 | $380.00 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.57 | 50 | $1,578.50 |

**Practice:** 327 - Conservation Cover

**Scenario** #28 - Native Species with Forgone Income

**Scenario Description:**

This practice applies on conventional or organically managed land needing permanent protective cover. This practice typically involves conversion from an intensive cropping system to permanent native vegetation (scenario includes native grass/legume mix). The typical size of the practice is 50 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts. Applies to conventional or organic systems.

**Before Situation:**

Crops such as vegetables and small fruit crops may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled mainly by cultivation. Soil surface residue amounts average 10% or less. Soil erosion exceeds tolerable rates and sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

**After Situation:**

The 327 Implementation Requirements have been developed for the site and applied. Managed land covered with permanent native grass/legume mix vegetation has reduced soil erosion, reduced water/sediment runoff, and improved air quality due to the elimination of dust emissions. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $19,799.25

**Scenario Cost/Unit:** $395.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 150 | $1,641.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 100 | $2,016.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 50 | $1,048.50 |
| **Foregone Income** | | | | | | |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 25 | $4,995.50 |
| FI, Oats Dryland | 1969 | Dryland Oats is Primary Crop | Acre | $221.43 | 25 | $5,535.75 |
| **Materials** | | | | | | |
| Two Species Mix, Warm Season, Native Perennial Grass | 2325 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $91.25 | 50 | $4,562.50 |

**Practice:** 327 - Conservation Cover

**Scenario** #29 - Pollinator Species with Forgone Income

**Scenario Description:**

Permanent vegetation, including a mix of native grasses, legumes, and forbs (mix may also include non-native species), established on land needing permanent vegetative cover that provides habitat for pollinators. Typical practice size is variable depending on site; this scenario uses 1 ac as the typical size. In addition to providing pollinator habitat, this practice scenario may also reduce sheet and rill erosion, improve soil quality, improve water quality, and improve air quality. The practice may also provide wildlife habitat. Practice applicable on cropland, odd areas, corners, etc. Applies to conventional or organic systems.

**Before Situation:**

Crops such as vegetables and small fruit crops may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled mainly by cultivation. Soil surface residue amounts average 10% or less. Soil erosion exceeds tolerable rates and sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife or pollinator habitat.

**After Situation:**

The 327 Implementation Requirements have been developed for the site and applied. Managed land covered with permanent pollinator habitat including a mix of native grasses, legumes, and forbs (mix may also include non-native species). This practice may also reduce soil erosion, reduce water/sediment runoff, and improve air quality due to the elimination of dust emissions. Plants sown for pollinator habitat may also provide cover for beneficial insects and wildlife. This scenario does not apply to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,256.75

**Scenario Cost/Unit:** $1,256.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 3 | $32.82 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 2 | $40.32 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Foregone Income** | | | | | | |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.5 | $99.91 |
| FI, Oats Dryland | 1969 | Dryland Oats is Primary Crop | Acre | $221.43 | 0.5 | $110.72 |
| **Materials** | | | | | | |
| Six Species Mix, Native Forb | 2334 | Native forb mix. Includes material and shipping only. | Acre | $952.01 | 1 | $952.01 |

**Practice:** 327 - Conservation Cover

**Scenario** #56 - Monarch Species Mix with Forgone Income

**Scenario Description:**

This scenario involves taking cropland out of production and establishing permanent vegetative cover for pollinator habitat according to state specifications. Typically used for high quality nectar and pollen for monarchs or other targeted species. Also used to address various sensitive wildlife habitats that require species not readily available but needed for a specific ecotype or that provide sequential flowering throughout the growing season or for other specific needs. Assumes seed/plugs, equipment and labor for seed bed prep/planting, and weed management during establishment. Not typically used for large-scale plantings. This is applicable to both organic and non-organic conditions. Amount contracted is calculated on actual acres planted. Resource concern treated is primarily degraded wildlife habitat but can also reduce soil erosion, improve soil quality, and improve water quality.

**Before Situation:**

Old hayfields or other crop fields that are harvested and lack milkweed or other plants needed for monarchs or other targeted species. Little to no wildlife or pollinator habitat is present.

**After Situation:**

Land is established with permanent cover for special ecotypes or for target species which could including a mix of milkweed, native grasses, legumes, or forbs as specified in the Implementation Requirements. Plants sown for monarch or other targeted species habitat may also provide cover for beneficial insects and wildlife.

**Feature Measure:** Acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,502.11

**Scenario Cost/Unit:** $1,502.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 3 | $32.82 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 2 | $40.32 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Foregone Income** | | | | | | |
| FI, Wheat Irrigated | 1964 | Irrigated Wheat is Primary Crop | Acre | $418.29 | 1 | $418.29 |
| **Materials** | | | | | | |
| Specialized native grass and forb mix | 2619 | A mix of native grass and forbs to be used for specialized purposes such as wildlife (including pollinators) or ecosystem restoration, requiring species not readility available and/or difficult to produce and harvest. Includes material and shipping only | Acre | $989.71 | 1 | $989.71 |

**Practice:** 328 - Conservation Crop Rotation

**Scenario** #1 - Basic Rotation Organic and Non-Organic

**Scenario Description:**

In this region this practice may be part of a conservation management system on both organic and non-organic operations to: 1) Reduce sheet, rill and wind erosion, 2) Maintain or increase soil health and organic matter content, 3) Reduce water quality degradation due to excess nutrients, 4) Improve soil moisture efficiency, 5) Reduce the concentration of salts and other chemicals from saline seeps, 6) Reduce plant pest pressures, 7) Provide feed and forage for domestic livestock, and 8) Provide food and cover habitat for wildlife, including pollinator forage, and nesting. This practice payment is provided to the producer for the time needed to plan and implement the logistics of changing the rotation to effectively implement a conservation crop rotation on a typical 200 acre cropland farm. No foregone income. Cost represents typical situations for conventional and organic producers.

**Before Situation:**

The rotation consists primarily of low residue producing row crops. Fields range from nearly flat to C and D slopes. Erosion, soil quality, and pest management are the primary concerns.

**After Situation:**

A rotation is established that provides additional high residue and/or perennial crops that may treat one or more of the following purposes: reduce sheet, rill and wind erosion, maintain or increase soil health and organic matter content, reduce water quality degradation due to excess nutrients, improve soil moisture efficiency, reduce the concentration of salts and other chemicals from saline seeps, reduce plant pest pressures, provide feed and forage for domestic livestock, or provide food and cover habitat for wildlife, including pollinator forage, and nesting.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,417.50

**Scenario Cost/Unit:** $14.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 30 | $1,417.50 |

**Practice:** 328 - Conservation Crop Rotation

**Scenario** #5 - Specialty Crops Organic and Non-Organic

**Scenario Description:**

In this region a rotation of organic or non-organic specialty crops (fruits and vegetable) are produced as part of a conservation management system to treat one or more of the following resource concerns: 1) Reduce sheet, rill and wind erosion, 2) Maintain or increase soil health and organic matter content, 3) Reduce water quality degradation due to excess nutrients, 4) Improve soil moisture efficiency, 5) Reduce the concentration of salts and other chemicals from saline seeps, 6) Reduce plant pest pressures, 7) Provide feed and forage for domestic livestock, and 8) Provide food and cover habitat for wildlife, including pollinator forage, and nesting. This practice payment is provided to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 50 acre specialty crop farm. No foregone income. Cost represents typical situations for organic and non-organic producers.

**Before Situation:**

This rotation consisted of growing specialty crops. Fields range from nearly flat to B and C slopes. Erosion, soil quality, and pest management are the primary concerns.

**After Situation:**

The rotation established adds higher residue crop(s) to the rotation that will treat one or more of the following resource concerns on organic and non- organic farms: 1) Reduce sheet, rill and wind erosion, 2) Maintain or increase soil health and organic matter content, 3) Reduce water quality degradation due to excess nutrients, 4) Improve soil moisture efficiency, 5) Reduce the concentration of salts and other chemicals from saline seeps, 6) Reduce plant pest pressures, 7) Provide feed and forage for domestic livestock, and 8) Provide food and cover habitat for wildlife, including pollinator forage, and nesting.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,890.00

**Scenario Cost/Unit:** $37.80

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |

**Practice:** 328 - Conservation Crop Rotation

**Scenario** #68 - Specialty Crops, Small Farm

**Scenario Description:**

A rotation of a diverse selection of crops (fruits and vegetables, organic or conventional) are produced on a small farm (30ac or less) as part of a conservation management system. Labor is needed to effectively research, develop, implement, and monitor a conservation crop rotation for a small farm setting. Often the growing season is year-round. Schedule this scenario on one field representing a set of small fields totaling 30 acres or less that use the same rotation. Schedule an acre-based scenario for additional fields using the same rotation. Resource concerns treated may include: 1) Maintain or increase soil health and organic matter content, 2) Reduce water quality degradation due to excess nutrients, 3) Reduce plant pest pressures 4) Reduce sheet, rill and wind erosion 5) Improve soil moisture efficiency, 6) Reduce the concentration of salts and other chemicals from saline seeps, 7) Provide feed and forage for domestic livestock, and 8) Provide food and cover habitat for wildlife, including pollinator forage, and nesting.

**Before Situation:**

Specialty or other crops are grown without the use of a prescribed rotation. Soil quality, excess nutrients, and pest management are the primary concerns.

**After Situation:**

The rotation established will treat one or more of the following resource concerns on farms: 1) Maintain or increase soil health and organic matter content, 2) Reduce water quality degradation due to excess nutrients, 3) Reduce plant pest pressures 4) Reduce sheet, rill and wind erosion 5) Improve soil moisture efficiency, 6) Reduce the concentration of salts and other chemicals from saline seeps, 7) Provide feed and forage for domestic livestock, and 8) Provide food and cover habitat for wildlife, including pollinator forage, and nesting.

**Feature Measure:** Crop rotations developed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,228.50

**Scenario Cost/Unit:** $1,228.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 26 | $1,228.50 |

**Practice:** 329 - Residue and Tillage Management, No-Till

**Scenario** #1 - No-Till/Strip-Till

**Scenario Description:**

This practice typically involves conversion from a clean-tilled (conventional tilled) system to no-till or strip-till system on 100 acres of cropland. This involves managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting soil-disturbing activities used to establish and harvest crops. The practice is used to reduce sheet and rill erosion, reduce wind erosion, improve soil quality, reduce CO2 losses from the soil, reduce energy use, increase plant available moisture and provide food and escape cover for wildlife. The no-till/strip-till system includes non-tillage types of weed control and may also include a period of no till fallow. System is applicable in both irrigated and non-irrigated fields of organic and non-organic operations.

**Before Situation:**

Row crops or small grains are grown and harvested. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and chemical application. Fields are disked immediately following harvest, with additional operations in some fields to facilitate drainage, seedbed preparation or additional weed control. Residue amounts after tillage operations average 10% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Sheet and rill erosion occurs with visible rills by spring. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. This system will typically have a negative Soil Conditioning Index (SCI) and a high Soil Tillage Intensity Rating (STIR).

**After Situation:**

The Implementation Requirements for 329 Residue Management, No Till is prepared and installed. Managing crop residue on the surface of a field (typical 100 acre) year around according to the 329 practice plan while limiting soil disturbing activities to those which place nutrients, and plant crops that meet the minimum criteria in the 329 practice standard. All crops are seeded/planted with a no-till drill or no-till/strip-till planter, which minimizes soil disturbance while establishing good seed-soil contact. All residues are to be maintained on the soil surface in a uniform distribution over the entire field and not burned or removed. Crop residues provide soil surface cover throughout the year. Runoff and erosion are reduced and no rills are visible on the soil surface. Wind erosion is reduced by standing residues and surface cover. Over time, soil health is improved due to the additional biomass (crop residues), ground cover, and soil infiltration. Crop residues and/or cover crop residues left on the soil surface may maximize weed control by increasing allelopathic and mulching effect, and provides cover for wildlife. The practice would require reducing soil disturbance and erosion and increasing biomass returned to the soil in sufficient amounts to achieve increased SCI and decreased STIR.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,974.00

**Scenario Cost/Unit:** $19.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 50 | $1,048.50 |
| Seeding Operation, No Till/Strip Till Planter | 1230 | No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor. | Acre | $18.51 | 50 | $925.50 |

**Practice:** 329 - Residue and Tillage Management, No-Till

**Scenario** #3 - No Till Adaptive Management

**Scenario Description:**

The practice scenario is for the implementation of no till in small replicated plots to allow the producer to learn how to manage no till on their operation. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement a particular no till management strategy (e.g., no till vs conventional till, drill vs planter, strip till vs no till, residue row cleaners, vs no row cleaners, etc.) This will be done by following the Agronomy Technical Note 10 - Adaptive Management.

**Before Situation:**

Row crops or small grains are grown and harvested. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and chemical application. Fields are disked immediately following harvest, with additional operations in some fields to facilitate drainage or additional weed control. Residue amounts after tillage operations average 10% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Sheet and rill erosion exceeds soil loss tolerances. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. This system will typically have a negative Soil Conditioning Index (SCI) and a high Soil Tillage Intensity Rating (STIR). The producer is considering using no till technology, but is unsure how to manage on their operation or needs to improve the management of no till to be successful.

**After Situation:**

Implementation Requirements are prepared and an Adaptive Management Plan for the plots is developed and implemented. Installation of this scenario will result in establishment of no till replicated plots to compare to different management strategies for no till and other residue management strategies following the guidance in the Agronomy Technical Note 10 - Adaptive Management Process. Implementation involves establishing the replicated plots to evaluate one or more no till management strategies. The plot will consist of at least 4 replicated plots designed, laid out, managed and evaluated with the assistance of a consultant knowledgeable in no till management. Results are used to make no till management decisions to address erosion, soil health, and water quality issues. Yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 10 - Adaptive Management. The yields for each plot will be adjusted to the appropriate moisture content. This would be repeated for 3 years.

**Feature Measure:** Based on 15 acre plots

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,691.50

**Scenario Cost/Unit:** $3,691.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 7.5 | $157.28 |
| Seeding Operation, No Till/Strip Till Planter | 1230 | No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor. | Acre | $18.51 | 7.5 | $138.83 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 20 | $2,259.40 |

**Practice:** 329 - Residue and Tillage Management, No-Till

**Scenario** #14 - No-Till/Strip-Till with Herbicide and No Cover Crop

**Scenario Description:**

This practice typically involves conversion from a clean-tilled (conventional tilled) system to no-till or strip-till system on 100 acres of cropland. This involves managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting soil-disturbing activities used to establish and harvest crops. The practice is used to reduce sheet and rill erosion, reduce wind erosion, improve soil quality, reduce CO2 losses from the soil, reduce energy use, increase plant available moisture and provide food and escape cover for wildlife. The no-till/strip-till system includes non-tillage types of weed control, which may include the use of herbicides and may also include a period of no till fallow. System is applicable in both irrigated and non-irrigated fields organic and non-organic operations. Herbicide treatment is to burndown weeds in the residue prior to planting the crop. This treatment is only when a cover crop is not present. Follow the Cover Crop (340) practice for herbicide burn down.

**Before Situation:**

Row crops or small grains are grown and harvested. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and chemical application. Fields are disked immediately following harvest, with additional operations in some fields to facilitate drainage, seedbed preparation or additional weed control. Residue amounts after tillage operations average 10% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Sheet and rill erosion occurs with visible rills by spring. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. This system will typically have a negative Soil Conditioning Index (SCI) and a high Soil Tillage Intensity Rating (STIR).

**After Situation:**

The Implementation Requirements for 329 Residue Management, No Till/Strip Till is prepared and installed. Managing crop residue on the surface of a field (typical 100 acre) year around according to the 329 practice plan while limiting soil disturbing activities to those which place nutrients, and plant crops that meet the minimum criteria in the 329 practice standard. All crops are seeded/planted with a no-till drill or no-till/strip-till planter, which minimizes soil disturbance while establishing good seed-soil contact. All residues are to be maintained on the soil surface in a uniform distribution over the entire field and not burned or removed. Crop residues provide soil surface cover throughout the year. Runoff and erosion are reduced and no rills are visible on the soil surface. Wind erosion is reduced by standing residues and surface cover. Over time, soil health is improved due to the additional biomass (crop residues), ground cover, and soil infiltration. Crop residues and/or cover crop residues left on the soil surface may maximize weed control by increasing allelopathic and mulching effect, and provides cover for wildlife. The practice would require reducing soil disturbance and erosion and increasing biomass returned to the soil in sufficient amounts to achieve increased SCI and decreased STIR.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,463.00

**Scenario Cost/Unit:** $44.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 100 | $602.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 50 | $1,048.50 |
| Seeding Operation, No Till/Strip Till Planter | 1230 | No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor. | Acre | $18.51 | 50 | $925.50 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 100 | $1,887.00 |

**Practice:** 330 - Contour Farming

**Scenario** #1 - Contour Farming

**Scenario Description:**

This scenario meets the specifications of the NRCS Contour Farming Standard. This scenario applies to fields greater than 5 acres. Payment reflects the extra labor and initial supervision costs in laying out and implementing contour farming. Annual erosion rates for the rotation exceeds tolerance levels. Excessive runoff leads to sedimentation of waterways

**Before Situation:**

The typical field size in this geographical region for this scenario is 30 acres. The field slope averages 6% while the slope length averages 160 feet. All farming operations on this cropland field including disking, bedding, planting, and cultivation are performed generally up and down the slope. Annual erosion rates for the rotation exceeds tolerance levels. Excessive runoff leads to sedimentation of waterways.

**After Situation:**

Implementation Requirements are prepared and implemented according to 330 Contour Farming. This practice is installed on the entire field. A survey is completed by trained and certified Federal, State, local personnel or consultant to determine and "stake" contour row arrangement. Permanent row markers are established to ensure that this practice is maintained for the life of this practice. All field operations including disking, bedding, planting, and cultivation are performed on the contour which is near perpendicular to the field slope. The farm manager is initially on site to ensure that equipment operators are properly following contour methods. Soil erosion rates are reduced by nearly half and may be below tolerance depending on the rotation. Likewise, sedimentation has been significantly reduced.

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $298.74

**Scenario Cost/Unit:** $9.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 5 | $135.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 3 | $141.75 |

**Practice:** 331 - Contour Orchard and Other Perennial Crops

**Scenario** #1 - Contour Orchards/Vineyards

**Scenario Description:**

This scenario meets the specifications of the NRCS 331 Contour Orchards and Perennial Crops Standard. This scenario applies to fields greater than 5 acres. Payment reflects the extra labor and initial supervision costs in implementing and following contour operations compared to other methods. More time is usually needed when following contour operations due to more equipment time in shorter rows and more equipment turning. Annual erosion rates for the rotation exceeds tolerance levels. Excessive runoff leads to sedimentation of waterways.

**Before Situation:**

The typical field size in this geographical region for this scenario is 10 acres. The field slope averages 6% while the slope length averages 160 feet. All farming operations are performed up and down the slope. Annual erosion rates for the rotation exceeds tolerance levels. Excessive runoff leads to sedimentation of waterways.

**After Situation:**

Implementation Requirements are prepared and implemented according to the Contour Orchards and Perennial Crops Standard (331). This practice is installed on the entire field. All field operations including: harvesting, disking, bedding, and planting are performed on the contour which is near perpendicular to the field slope. The farm manager is initially on site to ensure that equipment operators are properly following contour methods. Soil erosion rates are reduced to tolerable soil loss levels. Likewise, sedimentation has be significantly reduced.

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $298.74

**Scenario Cost/Unit:** $29.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 5 | $135.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 3 | $141.75 |

**Practice:** 332 - Contour Buffer Strips

**Scenario** #9 - Introduced Species, Forgone Income (Organic and Non-Organic)

**Scenario Description:**

Narrow strips of permanent, herbaceous vegetative cover established around the hill slope and alternated down the slope with wider cropped strips in between that are farmed on the contour. This practice applies to all cropland. Practice includes seedbed prep and planting of native species. The area of the contour grass strip is taken out of production. This applies to both organic and non-organic.

**Before Situation:**

The NRCS water erosion prediction software indicates that there is a significant amount of sheet and rill erosion and/or a significant amount of sediment potentially delivered to the downslope edge of the field. A secondary concern is that there may not be enough wildlife/pollinator habitat, food source or refugia in the field or farm.

**After Situation:**

Introduced grasses and legumes will be established in strips in the field to meet the Contour buffer Strips (332) criteria, resource needs, and producer objectives. Minimum widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Introduced species shall be selected that do not function as a host for diseases of a field crop and have physical characteristics necessary to control water erosion to tolerable levels in the cropped area of the field.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $335.46

**Scenario Cost/Unit:** $335.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Foregone Income** | | | | | | |
| FI, Oats Dryland | 1969 | Dryland Oats is Primary Crop | Acre | $221.43 | 1 | $221.43 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.48 | 30 | $14.40 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 20 | $9.00 |
| Sulfate of Potash | 263 | Approved for Organic Systems - Muriate of Potash | Pound | $0.66 | 20 | $13.20 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.57 | 1 | $31.57 |

**Practice:** 332 - Contour Buffer Strips

**Scenario** #10 - Native Species, Foregone Income (Organic and Non-organic)

**Scenario Description:**

Narrow strips of permanent, herbaceous vegetative cover established around the hill slope and alternated down the slope with wider cropped strips in between that are organically or non-organically farmed on the contour. This practice applies to all cropland. Practice includes seedbed prep and planting of native species. The area of the contour grass strip is taken out of production.

**Before Situation:**

The NRCS water erosion prediction software indicates that there is a significant amount of sheet and rill erosion and/or a significant amount of sediment potentially delivered to the downslope edge of the field. A secondary concern is that there may not be enough wildlife/pollinator habitat, food source or refugia in the field or farm.

**After Situation:**

Native grasses, legumes and forbs will be established in strips in the field to meet the Contour buffer Strips (332) criteria, resource needs, and producer objectives. Minimum widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Native species shall be selected that do not function as a host for diseases of a field crop and have physical characteristics necessary to control water erosion to tolerable levels in the cropped area of the field.

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $335.73

**Scenario Cost/Unit:** $335.73

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Foregone Income** | | | | | | |
| FI, Oats Dryland | 1969 | Dryland Oats is Primary Crop | Acre | $221.43 | 1 | $221.43 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $68.44 | 1 | $68.44 |

**Practice:** 332 - Contour Buffer Strips

**Scenario** #11 - Wildlife/Pollinator, Foregone Income (Organic and Non-Organic)

**Scenario Description:**

Narrow strips of permanent, herbaceous vegetative cover established around the hill slope and alternated down the slope with wider cropped strips in between that are farmed on the contour. This practice applies to all cropland. Practice includes seedbed prep and planting of mainly pollinator friendly species. The area of the field border is taken out of production. This applies to organic and no-organic.

**Before Situation:**

Water Erosion Calculator (e.g. RUSLE2) indicates that there is a significant amount of sheet and rill erosion and/or a significant amount of sediment potentially delivered to the downslope edge of the field. A secondary concern is that there may not be enough wildlife/pollinator habitat, food source or refugia in the field or farm.

**After Situation:**

Plant species will be established in strips in the field to meet the Contour buffer Strips (332) criteria, resource needs, producer objectives, and the targeted wildlife/pollinators necessary food and/or cover. Minimum widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall meet the wildlife/pollinator habitat requirements of the state and be adapted to site; not function as a host for diseases of a field crop and; have physical characteristics necessary to control sheet and rill erosion to tolerable levels on the cropped area of the field.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $480.51

**Scenario Cost/Unit:** $480.51

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Foregone Income** | | | | | | |
| FI, Oats Dryland | 1969 | Dryland Oats is Primary Crop | Acre | $221.43 | 1 | $221.43 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 1 | $213.22 |

**Practice:** 333 - Amending Soil Properties with Gypsum Products

**Scenario** #17 - Gypsum greater than 1 ton rate

**Scenario Description:**

Gypsum application of more than one ton/acre rate (typical average 1.5 tons/acre) to improve surface water quality due to phosphorus, pathogens, and soil health (Ca/Mg ratio). Scenario to be used in combination with an implemented nutrient management plan. The producer will use gypsum to improve soil surface structure and reduce concentration of dissolved reactive phosphorus (DRP) in runoff. Scenario includes the cost of material, application, and supervisor/management time to establish and manage new application methodology, including rates, timing, and sequence of application with other nutrient materials (i.e., manures, bio-solids, and fertilizers). The addressed resource concern is water quality and soil health. Associated practices are Nutrient Management (590), Conservation Crop Rotation (328), Cover Crop (340), Residue and Tillage Management, No-till (329) and Residue and Tillage Management, Reduced Till (345).

**Before Situation:**

Cropland in continuous production having relatively low soil organic matter and moderately high clay content with application of manure with a risk of pathogens. Soil in these fields has poor soil structure and a high risk of phosphorus and pathogen runoff. The soils are susceptible to soil crusting and as a result of long term tillage systems have a high concentration of phosphorous near the soil surface. The combination of poor soil structure and high nutrient levels at the soil surface results in runoff events with high concentrations of DRP that may contribute to degraded water quality.

**After Situation:**

A determination based on existing soil samples used in normal nutrient management has been made. The Implementation Requirements for Amending Soil Properties with Gypsum (333) has been developed for the site. The application of gypsum to the field based on the existing soil samples will result in reduced runoff and improved runoff water quality. This condition over time in combination with an implemented nutrient management plan and supporting practices to improve soil health will improve surface water quality.

**Feature Measure:** Acres with a gypsum product appli

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $2,619.45

**Scenario Cost/Unit:** $65.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 40 | $417.60 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Gypsum, Ground Ag Grade, Bulk | 1224 | Agricultural grade quarry ground gypsum (CaCO4) for dispersive soil treatment. Materials and delivery only. | Ton | $35.91 | 60 | $2,154.60 |

**Practice:** 333 - Amending Soil Properties with Gypsum Products

**Scenario** #18 - Gypsum less than 1 ton per acre

**Scenario Description:**

Gypsum application of less than or equal to one ton/acre rate (typical average 1 tons/acre) to improve surface water quality due to phosphorus, pathogens, and soil health (Ca/Mg ratio). Scenario to be used in combination with an implemented nutrient management plan. The producer will use gypsum to improve soil surface structure and reduce concentration of dissolved reactive phosphorus (DRP) in runoff. Scenario includes the cost of material, application, and management time to establish and manage new application methodology, including rates, timing, and sequence of application with other nutrient materials (i.e., manures, bio-solids, and fertilizers). . The addressed resource concern is water quality and soil health. Associated practices are Nutrient Management (590), Conservation Crop Rotation (328), Cover Crop (340), Residue and Tillage Management, No-till (329) and Residue and Tillage Management, Reduced Till (345).

**Before Situation:**

Cropland in continuous production having relatively low soil organic matter and moderately high clay content. Soil in these fields have poor soil structure and a high risk of phosphorus and pathogen runoff. The soils are susceptible to soil crusting and as a result of long term tillage systems have high concentration of phosphorous near the soil surface. The combination of poor soil structure and high nutrient levels at the soil surface results in runoff events with high concentrations of DRP that may contribute to degraded water quality.

**After Situation:**

A determination based on existing soil samples used in normal nutrient management has been made. The Implementation Requirements for Amending Soil Properties with Gypsum (333) has been developed for the site. The application of gypsum to the field is based on the existing soil samples and will result in reduce runoff and improve runoff water quality. This condition over time in combination with the implemented nutrient management plan and supporting practices to improve soil health will improve surface water quality.

**Feature Measure:** Acres with a gypsum product appli

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $1,542.15

**Scenario Cost/Unit:** $38.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 40 | $417.60 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Gypsum, Ground Ag Grade, Bulk | 1224 | Agricultural grade quarry ground gypsum (CaCO4) for dispersive soil treatment. Materials and delivery only. | Ton | $35.91 | 30 | $1,077.30 |

**Practice:** 334 - Controlled Traffic Farming

**Scenario** #1 - Controlled Traffic

**Scenario Description:**

This practice must be part of a conservation management system to reduce soil compaction. This scenario considers the time needed to modify equipment, develop the technical skills necessary to effectively implement a controlled traffic farming system on a typical 200 acre cropland farm. The controlled traffic generally utilizes RTK automatic steering technology to locate and maintain high load field traffic. This scenario represents the costs associated with reducing the amount of surface area tracked/compacted to 33% or less. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

**Before Situation:**

The typical scenario for this practice is a 200 acre row crop operation on high clay, poorly drained soils. Studies show that when high wheel load traffic is not controlled, up to 85% of the field is tracked causing some degree of soil compaction. Before the practice is installed traffic is uncontrolled tracking and 85% of the field has compacted soil which limits soil health.

**After Situation:**

An Implementation Requirement for Controlled Traffic (334) is developed and the controlled traffic lanes installed per the implementation requirements. After the practice is installed wheel/track traffic is confined to designated traffic lanes/tramlines. Wheel/track soil compaction is confined to the traffic lanes to protect the remaining surface area and subsoil from wheel/track compaction. The wheel/track traffic follows the installed traffic lanes/tramlines each year.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $12,162.40

**Scenario Cost/Unit:** $60.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 80 | $3,124.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |

**Practice:** 340 - Cover Crop

**Scenario** #1 - Cover Crop - Basic (Organic and Non-organic)

**Scenario Description:**

Typically a small grain or legume (may also use forage sorghum, radishes, turnips, buckwheat, etc.) will be planted as a cover crop immediately after harvest of a row crop, and will be followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using an approved herbicide prior to planting the subsequent crop.

**Before Situation:**

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Erosion exceeds soil loss tolerances. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

**After Situation:**

Implementation Requirements according to Cover Crop (340) are prepared and implemented. Within 30 days after harvest of the row crop, fields are planted with a small grain or legume cover crop (may also use forage sorghum, radishes, turnips, buckwheat, etc.), typically rye or clover. The average field size is 40 acres. The cover crop is seeded with a drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $3,351.20

**Scenario Cost/Unit:** $83.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 40 | $240.80 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 40 | $838.80 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 40 | $754.80 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 40 | $1,516.80 |

**Practice:** 340 - Cover Crop

**Scenario** #6 - Cover Crop - Adaptive Management

**Scenario Description:**

The practice scenario is for the implementation of cover crops in small replicated plots to allow the producer to learn how to manage cover crops on their operation. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement a particular cover crop management strategy (e.g., cover crop vs no cover crop, multiple species vs, single species, evaluate different termination methods or timings, using a legume vs no legume for nitrogen credits). This will be done following the guidance in the NRCS Technical Note 10 - Adaptive Management.

**Before Situation:**

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil. The producer is considering the use of cover crops but is unsure how to manage on their unique operation or is seeking a way to better manage cover crops in the operation.

**After Situation:**

Implementation Requirements for Cover Crop (340) will be prepared along with the Adaptive Management plan for the replicated cover crop plots and implemented. Installation of this scenario will result in establishment of a cover crop replicated plots to compare to different management strategies for cover crop management following the guidance in the Agronomy Technical Note 10 - Adaptive Management. Implementation involves establishing the replicated plots to evaluate one or more cover crop management strategies. The plot will consist of at least 4 replicated plots designed, laid out, managed and evaluated with the assistance of a consultant knowledgeable in cover crop management. Results are used to make cover crop management decisions to address erosion and water quality issues. Yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 10 - Adaptive Management. The yields for each plot will be adjusted to the appropriate moisture content. This would be repeated for 3 years.

**Feature Measure:** Area planted

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,897.90

**Scenario Cost/Unit:** $2,897.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 10 | $60.20 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 10 | $209.70 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 20 | $781.20 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 10 | $188.70 |
| Two Species Mix, Cool Season Annual (1 grass and 1 legume) | 2314 | Cool season annual grass and legume mix. Includes material and shipping only. | Acre | $52.21 | 10 | $522.10 |

**Practice:** 340 - Cover Crop

**Scenario** #11 - Cover Crop - Multiple Species (Organic and Non-organic)

**Scenario Description:**

Typically the multi-species cover crop (two or more species) mix includes a small grain, a legume, and may include other species such as forage sorghum, radishes, turnips, buckwheat, etc.). This mix will address all the purposes of the Cover Crop (340) standard. Typically the cover crop is seeded immediately after harvest of a row crop, but may be inter-seeded into a row crop using a broadcast seeder, drill, or similar device. The cover crop will be followed by another row crop and will utilize the residue as a mulch. The cover crop should be allowed to generate as much biomass as possible without delaying planting of the following crop. The cover crop will be terminated using an approved herbicide or tillage prior to planting the subsequent crop and terminated per the NRCS Cover Crop Termination Guidelines.

**Before Situation:**

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Erosion exceeds soil loss tolerances. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

**After Situation:**

Implementation Requirements according to Cover Crop (340) are prepared and implemented. Within 30 days after the harvest of row crop, fields are planted with a multi-species (2 or more species) cover crop mix that generally includes a small grain, a legume, and may include other species such as forage sorghum, radishes, turnips, buckwheat, etc. The average field size is 40 acres. The cover crop is seeded with a drill, broadcast seeder, aerial broadcast, or other method. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $3,922.80

**Scenario Cost/Unit:** $98.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 40 | $240.80 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 40 | $838.80 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 40 | $754.80 |
| Two Species Mix, Cool Season Annual (1 grass and 1 legume) | 2314 | Cool season annual grass and legume mix. Includes material and shipping only. | Acre | $52.21 | 40 | $2,088.40 |

**Practice:** 340 - Cover Crop

**Scenario** #36 - Cover Crop - Basic Organic

**Scenario Description:**

"Typically a small grain or small grain-legume mix (may also use forage sorghum, radishes, turnips, buckwheat, etc.) will be planted as a cover crop immediately after harvest of an organically grown crop, and will be followed by an organically grown crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a no-till drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using a mechanical kill method (mowing, rolling, undercutting, etc.), within weeks prior to planting the subsequent crop. This scenario REQUIRES use of Certified Organic Seed. Associated practices: Conservation Cover (327), Conservation Crop Rotation (328), Residue and Tillage Management, No-Till/Strip Till/Direct Seed (329), Critical Area Planting (342), Residue Management, Seasonal (344), Residue and Tillage Management, Mulch Till (345), Residue and Tillage Management, Ridge Till (346), Nutrient Management (590), Integrated Pest Management (595)."

**Before Situation:**

Organically grown crops such as various vegetable and fruit crops (along with organically produced row crops) are grown and harvested in mid-late fall. Fields are disked immediately following harvest. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

**After Situation:**

Within 30 days after harvest of organic crop, fields are planted with a small grain-legume mix cover crop, typically rye and clover. The average field size is 25 acres. The cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. The cover crop is terminated with using a mechanical kill method (mowing, rolling, undercutting, etc.), prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, and plant diversity introduced to the cropping system. Wind erosion is reduced by standing resides. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

**Feature Measure:** Area Planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $3,015.30

**Scenario Cost/Unit:** $100.51

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 30 | $604.80 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 30 | $629.10 |
| **Materials** | | | | | | |
| Certified Organic, One Species, Cool Season, Annual grass | 2338 | Certified organic cool season annual grass. Includes material and shipping only. | Acre | $59.38 | 30 | $1,781.40 |

**Practice:** 342 - Critical Area Planting

**Scenario** #1 - Native or Introduced Vegetation - Normal Tillage (Organic and Non-Organic)

**Scenario Description:**

Establishment of permanent vegetation (Native and Introduced) on a site (both organic and non-organic) that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

**Before Situation:**

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind and water erosion that exceed soil loss tolerances. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:**

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard. This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at a depth of four to six inches to improve fertility and ensure establishment of permanent vegetative cover. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $231.64

**Scenario Cost/Unit:** $231.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 2 | $21.88 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 1 | $6.50 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.48 | 30 | $14.40 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 60 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 60 | $24.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 2 | $77.76 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.57 | 1 | $31.57 |

**Practice:** 342 - Critical Area Planting

**Scenario** #4 - Native or Introduced Vegetation - Moderate Grading (Organic and Non-Organic)

**Scenario Description:**

Establishment of permanent vegetation (native and introduced) on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of small gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

**Before Situation:**

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc.) or human disturbance. The exposed areas have visible rills and small gullies averaging 1 foot in depth and 1 foot in width that requires some moderate grading to prepare a seedbed. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:**

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard.. This typical 1.0 acre critical area is stabilized by grading and shaping the small gullies with a dozer and then applying fertilizer, lime and seed. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $658.31

**Scenario Cost/Unit:** $658.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 4 | $259.68 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 2 | $21.88 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 1 | $6.50 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.48 | 30 | $14.40 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 60 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 60 | $24.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 2 | $77.76 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 1 | $37.92 |

**Practice:** 342 - Critical Area Planting

**Scenario** #6 - Native or Introduced Vegetation - Heavy Grading (Organic and Non-Organic)

**Scenario Description:**

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of moderate to severe gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

**Before Situation:**

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc.) or human disturbance. The exposed areas have visible rills and moderate to severe gullies averaging 3 feet in depth and 3 feet in width. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:**

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard. This typical 1.0 acre critical area is stabilized by grading and shaping the moderate to severe gullies with a dozer and then applying fertilizer, lime and seed. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,092.92

**Scenario Cost/Unit:** $1,092.92

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 8 | $519.36 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 2 | $21.88 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 1 | $6.50 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.48 | 30 | $14.40 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 60 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 60 | $24.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 2 | $77.76 |
| Two Species Mix, Cool Season Annual (1 grass and 1 legume) | 2314 | Cool season annual grass and legume mix. Includes material and shipping only. | Acre | $52.21 | 1 | $52.21 |

**Practice:** 342 - Critical Area Planting

**Scenario** #21 - Hydroseed

**Scenario Description:**

Establish permanent vegetative cover on natural or newly constructed conservation practice sites that are void of vegetation. Application method is hydro-seeding and is typically used on steep slopes or where vehicular access is limited. Resource concerns addressed include soil erosion and water quality.

**Before Situation:**

Area lack adequate vegetation resulting in bare soil being exposed to erosive processes. Exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:**

Area is stabilized with vegetative cover, reducing soil erosion and improving water quality.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,170.14

**Scenario Cost/Unit:** $2,170.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Seeding Operation, hydroseeder | 1291 | Hydroseeding with typical 1500 to 3600 gallon seeder. Includes all costs for equipment, power unit, and labor. | Acre | $2,074.34 | 1 | $2,074.34 |
| **Materials** | | | | | | |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 2 | $95.80 |

**Practice:** 345 - Residue and Tillage Management, Reduced Till

**Scenario** #3 - Mulch till-Adaptive Management

**Scenario Description:**

The practice scenario is for the implementation of mulch till in small replicated plots to allow the producer to learn how to manage mulch till on their operation. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement a particular mulch till management strategy (e.g., mulch till vs. conventional till, two different mulch till systems, etc.). This will be done following the guidelines outlined in Agronomy Technical Note 10 - Adaptive Management.

**Before Situation:**

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Erosion exceeds soil loss tolerances. Spring tillage and seedbed preparation activities occur as early as possible in the late winter and early spring prior to planting. Weed control is accomplished primarily through tillage, requiring multiple operations. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue monocultures, and long periods of bare soil. The producer is considering using mulch till technology, but is unsure how to manage on their operation or needs to improve the management of mulch till to be successful.

**After Situation:**

Implementation Requirements and the Adaptive Management Plan is prepared for the plots and implemented. Installation of this scenario will result in establishment of mulch till replicated plots to compare to different management strategies for mulch till and other residue management strategies following the guidelines outlined in Agronomy Technical Note 10 - Adaptive Management and the Adaptive Management Guidance 345 for Mulch Till. Implementation involves establishing the replicated plots to evaluate one or more reduced till management strategies. The plot will consist of at least four replicated plots designed, laid out, managed and evaluated with the assistance of a consultant knowledgeable in reduced till management. Results are used to make reduced till management decisions to address erosion, soil health, and water quality issues. Yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 10 - Adaptive Management. The yields for each plot will be adjusted to the appropriate moisture content and residue levels measured as needed. This practice will be repeated for three years.

**Feature Measure:** Area planted

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,335.00

**Scenario Cost/Unit:** $4,335.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 20 | $218.80 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 20 | $326.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 10 | $209.70 |
| Seeding Operation, No Till/Strip Till Planter | 1230 | No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor. | Acre | $18.51 | 10 | $185.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 20 | $2,259.40 |

**Practice:** 345 - Residue and Tillage Management, Reduced Till

**Scenario** #52 - Reduced Field Operations

**Scenario Description:**

This scenario typically involves conversion from a clean-tilled (conventional tilled) system to a “reduced-till” system; limiting the soil-disturbing activities used to grow crops in systems where the entire field surface is tilled by the planter/drill or tillage tools prior to planting. It can include tillage methods commonly referred to as mulch tillage, vertical tillage, chiseling and disking, or the use of high disturbance drills without additional tillage. It applies to stubble mulching on summer-fallowed land, to tillage for annually planted crops, to tillage for planted crops and to tillage for planting perennial crops. The NRCS erosion prediction model(s) will be used to review the farming operations and determine the amount of surface residue to manage throughout the rotation to keep soil loss below T. Resource concerns addressed include: Reduce sheet and rill erosion, reduce wind erosion and particulate matter, maintain or improve soil quality, increase plant-available moisture or reduce energy use.

**Before Situation:**

Crops such as corn, soybeans, small grains, or cotton are grown and harvested. Fields are tilled immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increase. Sheet, rill and wind erosion occurs. Spring tillage and seedbed preparation activities occur as early as possible in the late winter and early spring. Runoff from the fields flows into streams, water courses or other water bodies causing water quality degradation. Historically, periods of intensive tillage have led to excessive soil loss, often above the soil loss tolerance (T), due to the loss of crop residue on the soil surface. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue monocultures, and long periods of bare soil

**After Situation:**

The Implementation Requirements are prepared following the criteria in the 345 Residue and Tillage Management, Reduced Till conservation practice standard and meets the criteria of a STIR of 80 or less. Reduced till applies to all cropland and other lands where crops are planted. This scenario includes the use of a reduce till systems and high disturbance drills, such as a hoe drill, air seeder, or no-till drill that disturbs a large percentage of soil surface during the planting operation. The residue that remains on the soil surface provides soil cover during late fall, throughout the winter, and into the early spring. Runoff and water/wind erosion are reduced and water quality improves. Over time, soil health is improved due to less tillage, the additional biomass, ground cover, soil infiltration, and plant diversity in the cropping system.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,285.00

**Scenario Cost/Unit:** $42.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 200 | $2,188.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 100 | $2,097.00 |

**Practice:** 348 - Dam, Diversion

**Scenario** #1 - Rock/Gravel Fill

**Scenario Description:**

A rock structure with a gravel bedding on geotextile is built to divert all or part of the water from a waterway or a stream to provide water in such a manner that it can be controlled and used beneficially for irrigation, livestock water, fire control, municipal or industrial uses, develop renewable energy systems, or recreation, to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows. This structure will address the resource concerns of inefficient water use on Irrigated Land, inadequate water for livestock, and inadequate water supply for other beneficial uses.

**Before Situation:**

This practice applies where a diversion dam is needed as an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources, Diversion of water from an unstable watercourse to a stable watercourse is desirable, The water supply available is adequate for the purpose for which it is to be diverted, Adverse environmental impacts resulting from the installation of the practice can be overcome. This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. It does not apply where conservation practice standard Diversion (362), Floodwater Diversion (400), Dam (402), or Grade Stabilization Structure (410) would be used. This practice will provide beneficial uses for irrigation, livestock water, fire control, municipal or industrial uses, renewable energy systems, recreation, or to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows.

**After Situation:**

A rock structure of approximately 1050 cubic yards with a gravel bedding of approximately 450 cubic yards on approximately 200 square yards of geotextile, built to divert all or part of the water from a waterway or a stream. This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. This structure will be an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources, or diversion of water from an unstable watercourse to a stable watercourse as needed. The water supply available is adequate for the purpose for which it is to be diverted. Adverse environmental impacts resulting from the installation of the practice must be overcome. The sheet pile structure provides beneficial uses for irrigation, livestock water, fire control, municipal or industrial uses, renewable energy systems, recreation, or to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows. Any needed vegetation of disturbed areas must use Critical Area Planting (342). Other associated practices such as Channel Vegetation (322), Stream Habitat Improvement and Management (395), Channel Stabilization (584) will be as appropriate. Any needed head gates or flap gates to control the quantity of water being diverted must use Structure for Water Control (587).

**Feature Measure:** Fill in Cubic Yards

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,500.0

**Scenario Total Cost:** $85,341.29

**Scenario Cost/Unit:** $56.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1050 | $72,271.50 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 450 | $12,820.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 348 - Dam, Diversion

**Scenario** #2 - Earth Fill

**Scenario Description:**

An earth fill built to divert all or part of the water from a waterway or a stream to provide water in such a manner that it can be controlled and used beneficially for irrigation, livestock water, fire control, municipal or industrial uses, develop renewable energy systems, or recreation, to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows. This structure will address the resource concerns of inefficient water use on Irrigated Land, inadequate water for livestock, and inadequate water supply for other beneficial uses.

**Before Situation:**

This practice applies where a diversion dam is needed as an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources, Diversion of water from an unstable watercourse to a stable watercourse is desirable, The water supply available is adequate for the purpose for which it is to be diverted, Adverse environmental impacts resulting from the installation of the practice can be overcome. This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. It does not apply where conservation practice standard Diversion (362), Floodwater Diversion (400), Dam (402), or Grade Stabilization Structure (410) would be used. This practice will provide beneficial uses for irrigation, livestock water, fire control, municipal or industrial uses, renewable energy systems, recreation, or to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows.

**After Situation:**

An earth fill structure of approximately 1500 cubic yards is built to divert all or part of the water from a waterway or a stream. This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. This structure will be an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources, or diversion of water from an unstable watercourse to a stable watercourse as needed. The water supply available is adequate for the purpose for which it is to be diverted. Adverse environmental impacts resulting from the installation of the practice must be overcome. The sheet pile structure provides beneficial uses for irrigation, livestock water, fire control, municipal or industrial uses, renewable energy systems, recreation, or to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows. Any needed vegetation of disturbed areas must use Critical Area Planting (342). Other associated practices such as Channel Vegetation (322), Stream Habitat Improvement and Management (395), Channel Stabilization (584) will be as appropriate. Any needed head gates or flap gates to control the quantity of water being diverted must use Structure for Water Control (587).

**Feature Measure:** Volume of Earth Fill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,500.0

**Scenario Total Cost:** $12,536.99

**Scenario Cost/Unit:** $8.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Scraper, self propelled, 21 CY | 1208 | Self propelled earthmoving scraper with 21 CY capacity. Does not include labor. | Hour | $369.43 | 30 | $11,082.90 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 30 | $1,204.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 350 - Sediment Basin

**Scenario** #1 - Excavated basin

**Scenario Description:**

An excavated sediment basin in an existing drainage way on a farm for purpose of trapping sediment and preserving the capacity of reservoirs, ditches, canals, diversions, waterways and streams and to prevent undesirable deposition on bottom lands and other developed lands. The sediment basin is created solely by excavation. Excavated material is spoiled, not placed in a designed embankment. Earthen spillway is constructed as needed. Resource concerns addressed include excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Surface water causes the sediment (and potentially pesticides and nutrients) to be transported into the riparian areas and water bodies downstream.

**Before Situation:**

Disturbed areas on all land uses that have excessive erosion lead to deterioration of receiving waters due to excessive sedimentation.

**After Situation:**

The typical sediment basin is constructed by excavating 1200 cubic yards and spreading the spoil outside the pool area using a dozer or similar excavation equipment. The sediment storage capacity is about 700 cubic feet per acre of disturbed area and the detention storage is about 3000 cubic feet per acre of drainage area. Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, Pond Sealing or Lining (521A,521B,521C,521D).

**Feature Measure:** Excavated volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,200.0

**Scenario Total Cost:** $5,436.20

**Scenario Cost/Unit:** $4.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 30 | $3,652.50 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 32 | $1,285.12 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 350 - Sediment Basin

**Scenario** #2 - Embankment earthen basin with no pipe

**Scenario Description:**

An low hazard class embankment earthen sediment basin in an existing drainage way on a farm for purpose of trapping sediment and preserving the capacity of reservoirs, ditches, canals, diversions, waterways and streams and to prevent undesirable deposition on bottom lands and other developed lands. An earthen embankment will be constructed using the material that is excavated for the basin, creating a balanced cut and fill with no export or import. The basin will have an open auxiliary spillway, as designed. Resource concerns addressed include excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Surface water causes the sediment (and potentially pesticides and nutrients) to be transported into the riparian areas and water bodies downstream.

**Before Situation:**

Disturbed areas on all land uses that have excessive erosion lead to deterioration of receiving waters due to excessive sedimentation.

**After Situation:**

The typical sediment basin is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 1500 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The sediment storage capacity has a minimum of 900 cubic feet per acre of disturbed area. The detention storage has a minimum of 3600 cubic feet per acre of drainage area. The earthen auxiliary spillway will be constructed as designed based on Pond standard (378). No principal spillway will be used. Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, Pond Sealing or Lining (521A,521B,521C,521D).

**Feature Measure:** Embankment volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,500.0

**Scenario Total Cost:** $7,055.30

**Scenario Cost/Unit:** $4.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 40 | $4,870.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 42 | $1,686.72 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 350 - Sediment Basin

**Scenario** #3 - Embankment earthen basin with pipe

**Scenario Description:**

A low hazard class embankment earthen sediment basin in an existing drainage way on a farm for purpose of trapping sediment and preserving the capacity of reservoirs, ditches, canals, diversions, waterways and streams and to prevent undesirable deposition on bottom lands and other developed lands. An earthen embankment will be constructed from material excavated from the basin area with no import or export. The basin will have a principal spillway conduit and earthen auxiliary spillway, as designed. Resource concerns addressed include excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Surface water causes the sediment (and potentially pesticides and nutrients) to be transported into the riparian areas and water bodies downstream.

**Before Situation:**

Disturbed areas on all land uses that have excessive erosion lead to deterioration of receiving waters due to excessive sedimentation.

**After Situation:**

The typical sediment basin is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 1500 cubic yards to create an embankment. The embankment will be designed and constructed according the Pond standard (378). The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The sediment storage capacity should have an approximate minimum of 900 cubic feet per acre of disturbed area. The detention storage should be a minimum of 3600 cubic feet per acre of drainage area. The principal spillway is created using an approved conduit material and filter diaphragm. The earthen auxiliary spillway will be constructed as designed based on Pond standard (378). Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, Pond Sealing or Lining (521A,521B,521C,521D).

**Feature Measure:** Embankment volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,500.0

**Scenario Total Cost:** $11,676.15

**Scenario Cost/Unit:** $7.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 3 | $1,310.97 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 40 | $4,870.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 42 | $1,686.72 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 19.6 | $550.96 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 1.6 | $45.58 |
| Pipe, CMP, 18-16 gauge, weight priced | 1322 | 18 & 16 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.23 | 1662 | $2,044.26 |
| Trash Guard, metal | 1608 | Trash Guard, fabricated-steel, includes materials, equipment, and labor to transport and place Conical shaped trash guard for drop inlet spillway. Typically fabricated of CMP and steel. Includes materials, equipment, and labor to fabricate and transport. | Pound | $2.36 | 118 | $278.48 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 351 - Well Decommissioning

**Scenario** #1 - Shallow Well, 20ft deep or less

**Scenario Description:**

This scenario applied to a shallow, wide diameter water well 20' deep or less. A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.

**Before Situation:**

Shallow well or hand dug well that is 20 feet deep or less has been abandoned or is no longer in use. Well provides conduit for nutrients & pesticides to contaminate surface and groundwater.

**After Situation:**

Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations. Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence. Associated practices: 342 Critical Area Seeding. Typical well dimensions for this scenarios is 42" diameter, 15' deep = 5.3CuYds. The bottom 10' is sealed with grout; earth fill is placed in the top 5'.

**Feature Measure:** Well volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $4,098.32

**Scenario Cost/Unit:** $819.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 2 | $110.06 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 3 | $64.17 |
| Grout pump | 1334 | Grout pump with tremie pipe. Equipment and power unit costs. Labor not included. | Hour | $15.71 | 1 | $15.71 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 15 | $585.90 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 5 | $142.00 |
| **Materials** | | | | | | |
| Grout, cement | 1333 | Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place. | Cubic Yard | $814.22 | 3.6 | $2,931.19 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 351 - Well Decommissioning

**Scenario** #2 - Shallow Well, >20ft deep

**Scenario Description:**

This scenario applied to a shallow, wide diameter water well greater than 20' deep. A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.

**Before Situation:**

Shallow well or hand dug well that is more than 20 feet has been abandoned or is no longer in use. Well provides conduit for nutrients & pesticides to contaminate surface and groundwater.

**After Situation:**

Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations. Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence. Associated practices: 342 Critical Area Seeding. Typical well dimensions for this scenarios is 36" diameter, 30' deep = 7.9CuYds. Grout-sealed in bottom 20 ft.; earth fill in top 10'.

**Feature Measure:** Well Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 7.0

**Scenario Total Cost:** $6,733.61

**Scenario Cost/Unit:** $961.94

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 2 | $110.06 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 2 | $123.18 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 5 | $106.95 |
| Grout pump | 1334 | Grout pump with tremie pipe. Equipment and power unit costs. Labor not included. | Hour | $15.71 | 1 | $15.71 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 11 | $429.66 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 7 | $198.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 9 | $1,016.73 |
| **Materials** | | | | | | |
| Grout, cement | 1333 | Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place. | Cubic Yard | $814.22 | 5.2 | $4,233.94 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 351 - Well Decommissioning

**Scenario** #3 - Drilled Well, 300ft deep or less

**Scenario Description:**

This scenario applied to a drilled water well 300' deep or less and typically 6 or 8" diameter. A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.

**Before Situation:**

Drilled well that is less than 300 feet deep and 8" diameter (older wells are typically larger than 6" diameter) has been abandoned or is no longer in use. Well provides conduit for nutrients & pesticides to contaminate surface and groundwater.

**After Situation:**

Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations. Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence. Associated practices: 342 Critical Area Seeding. Typical well dimensions for this scenarios is 8" diameter, 200' deep. Grout-sealed in bottom 150 ft.; earth fill in top 50'.

**Feature Measure:** Depth of Well

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $7,633.48

**Scenario Cost/Unit:** $38.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 3 | $165.09 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 3 | $184.77 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 14 | $546.84 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 38 | $4,292.86 |
| **Materials** | | | | | | |
| Grout, cement | 1333 | Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place. | Cubic Yard | $814.22 | 1.9 | $1,547.02 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 351 - Well Decommissioning

**Scenario** #4 - Drilled Well, >300ft deep

**Scenario Description:**

This scenario applied to a drilled water well greater than 300' deep and typically 6 or 8" diameter. A licensed well driller will seal and permanently close inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.

**Before Situation:**

Drilled well that is greater than 300 feet deep, 6-8" diameter has been abandoned or is no longer in use. Well provides conduit for nutrients & pesticides to contaminate surface and groundwater.

**After Situation:**

Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations. Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence. Associated practices: 342 Critical Area Seeding. Typical well dimensions for this scenarios is 8" diameter, 500' deep. Grout-sealed in bottom 250 ft.; earth fill in top 250'.

**Feature Measure:** Depth of Well

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $9,955.91

**Scenario Cost/Unit:** $19.91

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 3 | $165.09 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 4 | $246.36 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 12 | $256.68 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 18 | $703.08 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 46 | $5,196.62 |
| **Materials** | | | | | | |
| Grout, cement | 1333 | Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place. | Cubic Yard | $814.22 | 3.2 | $2,605.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 353 - Monitoring Well

**Scenario** #3 - Borehole, 200 Ft. Depth or Less

**Scenario Description:**

A vertical borehole designed and installed 200 feet or less in depth to obtain representative groundwater quality samples and hydrogeologic information. The well provides controlled access for sampling groundwater near an agricultural waste storage or treatment facility to detect seepage and monitor groundwater quality. Installation methods must be in conformance with ASTM D5092. The resource concerns addressed include groundwater contamination and groundwater quality.

**Before Situation:**

This practice applies to the design, installation, and development of monitoring wells where contamination of groundwater from an agricultural waste storage or treatment facility is a concern, detection of seepage and monitoring of groundwater quality is needed, and the facility is a component of an agricultural waste management system.

**After Situation:**

Typical installation of a vertical borehole for a monitoring well 100 feet deep that provides controlled access to obtain water samples for detecting seepage and monitoring of groundwater quality from an agricultural waste storage or treatment facility as a component of an agricultural waste management system. The monitoring well is installed by drilling an 8 inch borehole, installing a protective casing, a 2 inch riser pipe, a well screen, and filter pack. The installation method was in conformance with ASTM D5092. Vegetation of disturbed areas will be completed under critical area planting (342). Erosion control during construction activities will use Stormwater Runoff Control (570). Other associated practices include Access Control (472), Water Well Decommissioning (351), Waste Storage Facility (313), Waste Treatment Lagoon (359), and Pumping Plant (533).

**Feature Measure:** Depth of Well

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $12,349.22

**Scenario Cost/Unit:** $123.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Rotary Drill Rig | 1595 | Rotary drill rig including equipment and power unit costs. Labor not included. | Hour | $333.23 | 25 | $8,330.75 |
| **Materials** | | | | | | |
| Bentonite | 41 | Bentonite, includes materials (50# bag) | Each | $22.25 | 6 | $133.50 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 6 | $170.94 |
| Aggregate, gravel, washed, pea gravel | 1331 | Washed and graded pea gravel river stone. Includes materials and local delivery within 20 miles of quarry. | Cubic Yard | $31.41 | 3 | $94.23 |
| Grout, cement | 1333 | Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place. | Cubic Yard | $814.22 | 3 | $2,442.66 |
| Well Cap, 6" | 1786 | Well cap, 6". Materials only. | Each | $34.23 | 1 | $34.23 |
| Well Casing, Metal, 6" | 1810 | Steel well casing, 6". Materials only. | Foot | $14.40 | 20 | $288.00 |
| Well Screen, plastic, 2" | 1997 | 2" PVC well screen. Materials only. | Foot | $4.07 | 25 | $101.75 |
| Pipe, PVC, Flush Thread, 2" SCH 40 | 2295 | Flush thread PVC riser pipe, 2" diameter, schedule 40. Materials only. | Foot | $2.45 | 110 | $269.50 |
| Centralizer, stainless steel, 2" | 2298 | Stainless steel centralizer to stabilize and center pipe in groundwater monitoring and other well installations. Materials only. | Each | $23.17 | 10 | $231.70 |
| End Cap, PVC, 2" | 2301 | PVC End cap used in groundwater monitoring and other well installations. Materials only. | Each | $2.67 | 1 | $2.67 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 353 - Monitoring Well

**Scenario** #4 - Borehole, Greater Than 200 Ft. Depth

**Scenario Description:**

A vertical borehole designed and installed greater than 200 feet deep to obtain representative groundwater quality samples and hydrogeologic information. The well provides controlled access for sampling groundwater near an agricultural waste storage or treatment facility to detect seepage and monitor groundwater quality. Installation methods must be in conformance with ASTM D5092. The resource concerns addressed include groundwater contamination and groundwater quality.

**Before Situation:**

This practice applies to the design, installation, and development of monitoring wells where contamination of groundwater from an agricultural waste storage or treatment facility is a concern, detection of seepage and monitoring of groundwater quality is needed, and the facility is a component of an agricultural waste management system.

**After Situation:**

Typical installation of a vertical borehole for a monitoring well 300 feet deep that provides controlled access to obtain water samples for detecting seepage and monitoring of groundwater quality from an agricultural waste storage or treatment facility as a component of an agricultural waste management system. The monitoring well is installed by drilling an 8 inch borehole, installing a protective casing, a 2 inch monitoring-riser pipe, a well screen, and filter pack. The installation method was in conformance with ASTM D5092. Vegetation of disturbed areas will be completed under critical area planting (342). Erosion control during construction activities will use Stormwater Runoff Control (570). Other associated practices include Access Control (472), Water Well Decommissioning (351), Waste Storage Facility (313), Waste Treatment Lagoon (359), and Pumping Plant (533).

**Feature Measure:** Depth of Well

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $38,007.18

**Scenario Cost/Unit:** $126.69

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Rotary Drill Rig | 1595 | Rotary drill rig including equipment and power unit costs. Labor not included. | Hour | $333.23 | 91 | $30,323.93 |
| **Materials** | | | | | | |
| Bentonite | 41 | Bentonite, includes materials (50# bag) | Each | $22.25 | 12 | $267.00 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 12 | $341.88 |
| Aggregate, gravel, washed, pea gravel | 1331 | Washed and graded pea gravel river stone. Includes materials and local delivery within 20 miles of quarry. | Cubic Yard | $31.41 | 6 | $188.46 |
| Grout, cement | 1333 | Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place. | Cubic Yard | $814.22 | 6 | $4,885.32 |
| Well Cap, 6" | 1786 | Well cap, 6". Materials only. | Each | $34.23 | 1 | $34.23 |
| Well Casing, Metal, 6" | 1810 | Steel well casing, 6". Materials only. | Foot | $14.40 | 20 | $288.00 |
| Well Screen, plastic, 2" | 1997 | 2" PVC well screen. Materials only. | Foot | $4.07 | 50 | $203.50 |
| Pipe, PVC, Flush Thread, 2" SCH 40 | 2295 | Flush thread PVC riser pipe, 2" diameter, schedule 40. Materials only. | Foot | $2.45 | 310 | $759.50 |
| Centralizer, stainless steel, 2" | 2298 | Stainless steel centralizer to stabilize and center pipe in groundwater monitoring and other well installations. Materials only. | Each | $23.17 | 20 | $463.40 |
| End Cap, PVC, 2" | 2301 | PVC End cap used in groundwater monitoring and other well installations. Materials only. | Each | $2.67 | 1 | $2.67 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 355 - Groundwater Testing

**Scenario** #1 - Basic Water Test

**Scenario Description:**

Typical scenario includes the professional testing for nitrates, nitrites, and coliform to confirm well water meets basic water quality standards for consumption by livestock or use in irrigation. Water samples are sent to an EPA or state certified laboratory for testing. This scenario is recommended when water quality is suspected to be acceptable.

**Before Situation:**

There are no known contaminants of the well, however, neighboring wells have known issues with nitrates, or coliform, and confirmation of acceptable water quality is desired. Manure is spread near to the well, following a nutrient management plan; well contamination is unlikely but possible.

**After Situation:**

Water quality results are known.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $58.30

**Scenario Cost/Unit:** $58.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 0.5 | $14.20 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Irrigation Suitability | 310 | Irrigation water suitability lab analysis. Includes pH, alkalinity, carbonates/bicarbonates, EC, dissolved solids, B, Cl, Ca, Mg, Na, SAR, and hardness. | Each | $44.10 | 1 | $44.10 |

**Practice:** 356 - Dike

**Scenario** #1 - Material haul, <= 1 mile

**Scenario Description:**

Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Material haul <= 1 mile. Associated practices include, but are not limited to: Conservation Cover (327), Constructed Wetland (656), Critical Area Planting (342), Ponds (378), Fence (382), Irrigation Land Leveling (464), Obstruction Removal (500), Prescribed Grazing (528), Structure for Water Control (587), Underground Outlet (620), Upland Wildlife Management (645), Wetland Creation (658), Wetland Enhancement (659), Wetland Restoration (657), Wetland Wildlife Habitat Management (644).

**Before Situation:**

Site is subject to flooding or inundation which poses a potential hazard to public safety, damage to land or property. Site may also require control of water level for purposes connected with crop production; fish and wildlife management; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul <= 1 mile.

**After Situation:**

Water level controlled by a stable earthen structure. Potential hazard to public safety, land or property mitigated; environmental benefit provided. Typical scenario is for removal of sod layer, importing fill from 1 mile away, placement and compaction of fill and final site grading. Typical earthen dike assumed 1000 lineal feet, 6 ft. in height, 10 ft. top width, 2.5 H:1V side slopes. Post construction seeding and erosion control are not part of the scenario cost and should be contracted separately.

**Feature Measure:** Volume of Earthfill (including volu

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 6,111.0

**Scenario Total Cost:** $49,039.02

**Scenario Cost/Unit:** $8.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $307.21 | 1 | $307.21 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 6111 | $14,116.41 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 6111 | $26,705.07 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 24 | $2,922.00 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 6111 | $1,955.52 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 3 | $1,427.88 |

**Practice:** 356 - Dike

**Scenario** #2 - Material haul, > 1 mile

**Scenario Description:**

Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Material haul <= 1 mile. Associated practices include, but are not limited to: Conservation Cover (327), Constructed Wetland (656), Critical Area Planting (342), Ponds (378), Fence (382), Irrigation Land Leveling (464), Obstruction Removal (500), Prescribed Grazing (528), Structure for Water Control (587), Underground Outlet (620), Upland Wildlife Management (645), Wetland Creation (658), Wetland Enhancement (659), Wetland Restoration (657), Wetland Wildlife Habitat Management (644).

**Before Situation:**

Site is subject to flooding or inundation which poses a potential hazard to public safety, damage to land or property. Site may also require control of water level for purposes connected with crop production; fish and wildlife management; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul > 1 mile.

**After Situation:**

Water level controlled by a stable earthen structure. Potential hazard to public safety, land or property mitigated; environmental benefit provided. Typical scenario is for removal of sod layer, importing fill from 3 miles away, placement and compaction of fill and final site grading. Typical earthen dike assumed 1000 lineal feet, 6 ft. in height, 10 ft. top width, 2.5 H:1V side slopes. Post construction seeding and erosion control are not part of the scenario cost and should be contracted separately.

**Feature Measure:** Volume of Earthfill (including volu

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 6,111.0

**Scenario Total Cost:** $52,950.06

**Scenario Cost/Unit:** $8.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $307.21 | 1 | $307.21 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 6111 | $14,116.41 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 6111 | $26,705.07 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 24 | $2,922.00 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 18333 | $5,866.56 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 3 | $1,427.88 |

**Practice:** 356 - Dike

**Scenario** #3 - Class IV A and B, Wetland

**Scenario Description:**

Construction of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Typical earthen dike assumed 1000 lineal feet, Class IV A or B (2ft. in height, 8 ft. top width, 3H:1V side slopes). Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS500 Obstruction Removal, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.

**Before Situation:**

Site is subject to flooding or inundation which poses a potential hazard to public safety, damage to land or property. Site may also require control of water level for purposes connected with crop production; fish and wildlife management; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul < 1 mile.

**After Situation:**

Water level controlled by a stable earthen structure. Potential hazard to public safety, land or property mitigated; environmental benefit provided.

**Feature Measure:** Volume of Earthfill (including volu

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,037.0

**Scenario Total Cost:** $5,812.45

**Scenario Cost/Unit:** $5.61

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 160 HP | 1203 | Agricultural tractor with horsepower range of 140 to 190. Equipment and power unit costs. Labor not included. | Hour | $78.19 | 20 | $1,563.80 |
| Scraper, pull, 7 CY | 1206 | Pull type earthmoving scraper with 7 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 160 HP typically required for single scraper. | Hour | $15.72 | 20 | $314.40 |
| Roller, static, smooth, self propelled | 1392 | Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor. | Hour | $15.66 | 16 | $250.56 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 24 | $650.88 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 3 | $1,427.88 |

**Practice:** 356 - Dike

**Scenario** #4 - Class IV A and B, Wetland, Protected

**Scenario Description:**

Construction of an rock-armored, earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, protection against wave action OR reinforced spillway, and foundation and embankment stability. Haul in materials for protecting dike surface/spillway. Typical earthen dike assumed 1000 lineal feet, Class IV A or B (2ft. in height, 8 ft. top width, 3H:1V side slopes). Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS500 Obstruction Removal, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.

**Before Situation:**

Site is subject to flooding or inundation which poses a potential hazard to public safety, damage to land or property. In addition the size, location, and layout of the project is such that sufficient fetch distance is present to develop potentially damaging wave action OR dike is required to have an emergency spillway that is lined either with rock or geotextile for reinforcement. Site may also require control of water level for purposes connected with crop production; fish and wildlife management; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul < 1 mile.

**After Situation:**

Water level controlled by a stable, rock-armored, earthen structure, OR rock or geotextile lined spillway on the earthen structure. Potential hazard to public safety, land or property mitigated; environmental benefit provided.

**Feature Measure:** Volume of Earthfill (including volu

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,037.0

**Scenario Total Cost:** $7,237.39

**Scenario Cost/Unit:** $6.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 160 HP | 1203 | Agricultural tractor with horsepower range of 140 to 190. Equipment and power unit costs. Labor not included. | Hour | $78.19 | 20 | $1,563.80 |
| Scraper, pull, 7 CY | 1206 | Pull type earthmoving scraper with 7 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 160 HP typically required for single scraper. | Hour | $15.72 | 20 | $314.40 |
| Roller, static, smooth, self propelled | 1392 | Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor. | Hour | $15.66 | 16 | $250.56 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 609 | $194.88 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 24 | $650.88 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 39 | $1,230.06 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 3 | $1,427.88 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #1 - Poultry House Soil Remediation

**Scenario Description:**

This practice scenario includes the remediation of the soil in an abandoned poultry structures previously used to store poultry waste (litter) on an earthen floor. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342).

**Before Situation:**

The abandoned poultry house has a damaged roof exposing the earthen floor of the structure to rainfall. Rainfall and nutrients on the floor of the house pose a risk to surface water from contaminated runoff or to ground water from seepage into the underlying soils.

**After Situation:**

This scenario is based on a 40' wide x 400' long poultry house with 1 foot depth of nutrient laden soil to remediate (16,000 CF). Payment under this scenario includes only activities associated with the soil remediation. Soil remediation activities in this scenario include removing the nutrient enriched soil found in the first 7 inches of soil beneath the litter floor and mixing wood chips with the remaining 5 inches of soil. Nutrient level testing and field application of the removed soil shall be performed according to nutrient planning in conformance with Nutrient Management, Code 590. The remaining 5 inches of soil will be remediated in-situ by mixing in wood chips, at a rate of 33% of the volume of remaining soil, for the purpose of nitrogen sequestration. Additional soil will be hauled in (estimated at 110% of the soil volume that was removed for field application) to backfill the depression. Shaping and crowning of the soil material on the disturbed area and critical area seeding will be done to provide drainage, complete the site remediation and establish vegetation. Operation and maintenance of the site will include nutrient testing the following year to determine if the nutrients in the mixed soil have been remediated and surface and ground water resource concerns have been addressed. In this scenario, samples at four (4) locations will be taken at 6, 12, 18 and 24 inches at the end of Year 1.

**Feature Measure:** Cubic feet of soil remediated

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 16,000.0

**Scenario Total Cost:** $12,546.41

**Scenario Cost/Unit:** $0.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 380 | $1,364.20 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 31 | $3,461.46 |
| Manure, compost, application | 955 | Loading, hauling and spreading manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Hour | $110.62 | 19 | $2,101.78 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 1 | $56.64 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.87 | 82 | $1,875.34 |
| Front End Loader, 185 HP | 1619 | Wheeled front end loader with horsepower range of 160 to 210. Equipment and power unit costs. Labor not included. | Hour | $91.96 | 6 | $551.76 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1 | $27.12 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 31 | $1,244.96 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 16 | $163.36 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #2 - Feedlot Closure

**Scenario Description:**

This practice scenario includes the remediation of the soil on an abandoned feedlot previously used to feed animals on a bare earthen lot. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342).

**Before Situation:**

The feedlot is abandoned. Vegetation has not been reestablished. The high level of nutrients in the soil is preventing volunteer establishment of native vegetation. Rainfall and nutrients on the bare earth feedlot pose a risk to surface water from contaminated runoff or to ground water from seepage into the underlying soils.

**After Situation:**

This scenario is based on a 3 acre feedlot. Surveys and testing have determined the manure pack averages 8 inches in depth and the level of nutrients in the 4 inches of soil below the manure pack is too high to treat in situations with vegetation. Payment under this scenario includes only activities associated with the soil remediation. Soil remediation activities in this scenario include removing the nutrient enriched manure pack and soil, an average of 12 inches below the existing surface (130,680 CF). The excavated surface will be vegetated with a mix of salt tolerant plants in conformance with Critical Area Planting, Code 342. Nutrient level testing and field application of the removed soil shall be performed according to nutrient planning in conformance with Nutrient Management, Code 590. Shaping and crowning of the soil material on the disturbed area and critical area seeding will be done to provide drainage, complete the site remediation and establish vegetation. Operation and maintenance of the site will include nutrient testing the following year to determine if the soil has been remediated and surface and ground water resource concerns have been addressed. In this scenario, samples at four (4) locations will be taken at 6, 12, 18 and 24 inches at the end of Year 1. Fence and feedbunk removal is to be performed under Obstruction Removal, Code 500.

**Feature Measure:** Cubic feet of soil remediated

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 130,680.0

**Scenario Total Cost:** $36,491.52

**Scenario Cost/Unit:** $0.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 40 | $4,466.40 |
| Manure, compost, application | 955 | Loading, hauling and spreading manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Hour | $110.62 | 269 | $29,756.78 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 16 | $163.36 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #3 - Demolition of Concrete Waste Storage Structure

**Scenario Description:**

This practice scenario includes the demolition of a concrete waste storage structure. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342)

**Before Situation:**

An existing concrete waste storage structure is no longer functioning correctly or is not being used for its intended purpose. It poses a safety hazard for humans and livestock and is a threat to environmentally sustainability by the potential for impacts to water and air quality.

**After Situation:**

This scenario assumes a concrete waste storage structure, with top dimensions of 60 ft x 60 ft with 10 ft vertical walls. The walls are 8 inches thick, the concrete floor is 5 inches thick and the footing for the wall is 12 inches wide by 24 inches deep. The total structural storage volume equals 36,000 cubic feet. The total volume of concrete to be demolished is 3,580 cubic feet ([2 X (60 ft + 60 ft) X 10 ft X 8in /12 in/ft] + [60 ft X 60 ft X 5in /12 in/ft] + [2 X (60 ft + 60 ft) X 12in /12 in/ft X 24in /12in/ft]). The volume of waste to be removed approximately equals 50% of the structural volume (50% X 36,000 = 18,000 CF). The volume of earthwork (earthfill and/or excavation, final grading) required is approximately 50% of the structural volume. The concrete will be demolished and hauled off-site for recycling or disposal. Structural removal, as necessary, may include the sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Demolition of a concrete waste storage structure includes agitating, removing, and spreading the waste remaining in the structure. All waste material shall be land applied in accordance with Nutrient Management (590). Excavated areas will be filled in. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Demolition of the concrete waste structure will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment. The site will also become available for another use.

**Feature Measure:** Cubic Feet of concrete to be demol

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 3,580.0

**Scenario Total Cost:** $9,511.56

**Scenario Cost/Unit:** $2.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 667 | $2,914.79 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 10 | $1,116.60 |
| Manure, compost, injection | 956 | Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Gallon | $0.01 | 134640 | $1,346.40 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 133 | $1,549.45 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 1330 | $425.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 10 | $401.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #4 - Waste Storage Pond Decommissioning

**Scenario Description:**

This practice scenario includes the decommissioning of an earthen liquid waste impoundment (embankment or excavated type). The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342)

**Before Situation:**

An existing lagoon or waste storage pond is no longer functioning correctly, has passed the practice lifespan, no longer meets the practice standard or is not being used for its intended purpose. It poses a safety hazard for humans and livestock and is a threat to environmental sustainability by the potential for impacts to water and air quality.

**After Situation:**

This scenario assumes a waste storage pond, with top dimensions of 110 ft x 110 ft, 8 ft total depth with 2:1 side slopes. The total structural storage volume equals 63,851 cubic feet. The volume of liquid waste to be pumped approximately equals 50% if the structural volume (50% X 63,851 CF = 31,925 CF). The volume of solid waste to be removed approximately equals 50% of the structural volume (50% X 63,851 = 31,925 CF). The volume of earthwork (earthfill and excavation) required to breach the embankment and/or fill in the impoundment and perform final grading of the site is approximately 50% of the structural volume. The volume of earthwork will include 60% as excavation and 40% as compacted earthfill. Structural removal, as necessary, may include the removal and disposal of the synthetic liner, sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Decommissioning of a liquid waste storage impoundment includes agitating, removing, and spreading liquid/slurry waste material, removing solid/sludge waste remaining in the bottom. All waste material shall be land applied in accordance with Nutrient Management (590). If present, the synthetic liner will be removed and properly disposed of. All inflow devices and associated appurtenances will be removed and properly disposed of. The embankment will be breached and the excavation filled in with the embankment material or hauled in earthfill. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Closure of the waste impoundment will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment. The site will also become available for another use.

**Feature Measure:** Cubic feet of structural storage

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 63,851.0

**Scenario Total Cost:** $18,410.78

**Scenario Cost/Unit:** $0.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 709 | $1,637.79 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 473 | $2,067.01 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 4 | $446.64 |
| Manure, compost, injection | 956 | Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Gallon | $0.01 | 238803 | $2,388.03 |
| Spreading, manure sludge | 1633 | Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs. | Cubic Foot | $0.31 | 31925 | $9,896.75 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #5 - Waste Storage Pond Decommissioning, Imported fill

**Scenario Description:**

This practice scenario includes the decommissioning of an earthen liquid waste impoundment (embankment or excavated type) where Imported fill is required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342)

**Before Situation:**

An existing lagoon or waste storage pond is no longer functioning correctly or is not being used for its intended purpose. It poses a safety hazard for humans and livestock and is a threat to environmental sustainability by the potential for impacts to water and air quality.

**After Situation:**

This scenario assumes a waste storage pond, with top dimensions of 110 ft x 110 ft, 8 ft total depth with 2:1 side slopes. The total structural storage volume equals 63,851 cubic feet. The volume of liquid waste to be pumped approximately equals 50% if the structural volume (50% X 63,851 CF = 31,925 CF). The volume of solid waste to be removed approximately equals 50% of the structural volume (50% X 63,851 = 31,925 CF). The volume of earthwork (earthfill and excavation) required to breach the embankment and/or fill in the impoundment and perform final grading of the site is approximately 80% of the structural volume (80% of the ponds storage is below ground), 60% of fill needed will need to be imported from off site. Typical haul distance is 1 mile. Structural removal, as necessary, may include the removal and disposal of the synthetic liner, sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Decommissioning of a liquid waste storage impoundment includes agitating, removing, and spreading liquid/slurry waste material, removing solid/sludge waste remaining in the bottom. All waste material shall be land applied in accordance with Nutrient Management (590). If present, the synthetic liner will be removed and properly disposed of. All inflow devices and associated appurtenances will be removed and properly disposed of. The embankment will be breached and the excavation filled in with the embankment material or hauled in earthfill. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Closure of the waste impoundment will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment. The site will also become available for another use.

**Feature Measure:** Cubic feet of structural storage

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 63,851.0

**Scenario Total Cost:** $27,732.01

**Scenario Cost/Unit:** $0.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 757 | $1,748.67 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 1362 | $5,951.94 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 1362 | $4,889.58 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 4 | $446.64 |
| Manure, compost, injection | 956 | Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Gallon | $0.01 | 238803 | $2,388.03 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 1362 | $435.84 |
| Spreading, manure sludge | 1633 | Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs. | Cubic Foot | $0.31 | 31925 | $9,896.75 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #6 - Liquid Waste Impoundment Conversion to Fresh Water Storage

**Scenario Description:**

This practice scenario includes the conversion of an earthen liquid waste impoundment (embankment or excavated type) to fresh water storage. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342), Pond Sealing and Lining (521)

**Before Situation:**

An existing lagoon or waste storage pond is no longer functioning correctly or is not being used for its intended purpose. It poses a safety hazard for humans and livestock and is a threat to environmental sustainability by the potential for impacts to water and air quality.

**After Situation:**

This scenario assumes a waste storage pond, with top dimensions of 110 ft x 110 ft, 8 ft total depth with 2:1 side slopes. The total structural storage volume equals 63,851 cubic feet. The volume of liquid waste to be pumped approximately equals 50% of the structural volume (50% X 63,851 CF = 31,925 CF). The volume of solid waste to be removed approximately equals 50% of the structural volume (50% X 63,851 = 31,925 CF). The volume of earthwork (earthfill and/or excavation) required to meet current NRCS standards and perform final grading and shaping of the site is approximately 5% of the structural volume. Structural removal, as necessary, may include the sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Conversion of a liquid waste storage impoundment for fresh water storage includes agitating, removing, and spreading liquid/slurry waste material, removing solid/sludge waste remaining in the bottom. All waste material shall be land applied in accordance with Nutrient Management (590). All inflow devices and associated appurtenances will be removed and properly disposed of. The embankment will be brought up to current NRCS standards for its intended purpose. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Conversion to fresh water storage will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment.

**Feature Measure:** Cubic feet of structural storage

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 63,851.0

**Scenario Total Cost:** $15,715.32

**Scenario Cost/Unit:** $0.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 118 | $515.66 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 8 | $893.28 |
| Manure, compost, injection | 956 | Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Gallon | $0.01 | 238803 | $2,388.03 |
| Spreading, manure sludge | 1633 | Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs. | Cubic Foot | $0.31 | 31925 | $9,896.75 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 362 - Diversion

**Scenario** #1 - Small, less than or equal to 0.5 CY per LF

**Scenario Description:**

An earthen channel constructed across long slopes with supporting ridge on lower side, to divert runoff away from farmsteads, agricultural waste systems, streams, gullies, critical erosion areas, construction areas or other sensitive areas. Outlet may be waterway, underground outlet. or other suitable outlet. Typical diversion is, 1000 feet long installed on a field slope of 5 percent and requires less than 1/2 CY excavation per LF. Channel my be level or gradient and ridge may be vegetated or farmed. The quantity of excavation and fill is balanced.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm or range fields, along access roads, and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

A diversion channel 1000 feet long requiring 0.4 cy of excavation per linear foot of channel is installed using a backhoe or small dozer. Field system meets "T" or "clean" storm water runoff is diverted away from streams, sensitive areas, or an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Underground Outlet (620), Mulching (484), and Subsurface Drainage (606).

**Feature Measure:** Length of Diversion

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $3,321.88

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 400 | $924.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 400 | $1,748.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 362 - Diversion

**Scenario** #2 - Medium-Small, >0.5 -1 CY per LF

**Scenario Description:**

An earthen channel constructed across long slopes with supporting ridge on lower side, to divert runoff away from farmsteads, agricultural waste systems, gullies, critical erosion areas, construction areas or other sensitive areas. Outlet may be a waterway, underground outlet. or other suitable outlet. Typical diversion is, 1000 feet long installed on a field slope of 5 percent and requires 1/2 - 1 CY excavation per LF. Channel may be level or gradient and ridge may be vegetated or farmed. The quantity of excavation and fill is balanced.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm or range fields, along access roads, or other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

A diversion channel 1000 feet long requiring 0.8 cy of excavation per linear foot of channel is installed using a backhoe or small dozer. Field system meets "T" or "clean" storm water runoff is diverted away from streams, sensitive areas, or an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Underground Outlet (620), Mulching (484), and Subsurface Drainage (606).

**Feature Measure:** Length of Diversion

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $6,022.28

**Scenario Cost/Unit:** $6.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 800 | $1,848.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 800 | $3,496.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 3 | $85.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 362 - Diversion

**Scenario** #3 - Medium-Large, >1 - 2 CY per LF

**Scenario Description:**

An earthen channel constructed across long slopes with supporting ridge on lower side, to be used with large scale projects perhaps for flooding issues to divert runoff away from farmsteads, agricultural waste systems, gullies, critical erosion areas, construction areas or other sensitive areas. Outlet may be waterway, underground outlet. or other suitable outlet. Typical diversion is, 1000 feet long installed on a field slope of 5 percent and requires >1 - 2 CY excavation per LF. Channel my be level or gradient and ridge may be vegetated or farmed. The quantity of excavation and fill is balanced.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of flooding, gully, rill or sheet erosion which exceeds "T" from farm fields and other locations.

**After Situation:**

A diversion channel 1000 feet long requiring 1.5 cy of excavation per linear foot of channel is installed using a backhoe or small dozer. Field system meets "T" or "clean" storm water runoff is diverted away from streams, sensitive areas, or an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Underground Outlet (620), Mulching (484), and Subsurface Drainage (606).

**Feature Measure:** Diversion Fill Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $13,278.35

**Scenario Cost/Unit:** $13.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 1500 | $6,555.00 |
| Excavation, common earth, large equipment, 1500 ft | 1221 | Bulk excavation of common earth including sand and gravel with scrapers with average haul distance of 1500 feet. Includes equipment and labor. | Cubic Yard | $3.86 | 1500 | $5,790.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 362 - Diversion

**Scenario** #4 - Large, > 2 CY per LF

**Scenario Description:**

An earthen channel constructed across long slopes with supporting ridge on lower side on very large scale projects, perhaps involving flooding issues, to divert runoff away from farmsteads, agricultural waste systems, gullies, critical erosion areas, construction areas or other sensitive areas. Outlet may be waterway, underground outlet. or other suitable outlet. Typical diversion is, 1000 feet long installed on a field slope of 5 percent and requires greater than 2 CY excavation per LF. Channel may be level or gradient and ridge may be vegetated or farmed. The quantity of excavation and fill is balanced.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of flooding, gully, rill or sheet erosion which exceeds "T" from farm fields and other locations.

**After Situation:**

A diversion channel 1000 feet long requiring 2.5 cy of excavation per linear foot of channel is installed using a backhoe or small dozer. Field system meets "T" or "clean" storm water runoff is diverted away from streams, sensitive areas, or an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Underground Outlet (620), Mulching (484), and Subsurface Drainage (606).

**Feature Measure:** Diversion Fill Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $21,171.70

**Scenario Cost/Unit:** $21.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 2500 | $10,925.00 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.68 | 2500 | $9,200.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 3 | $85.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 5 | $236.25 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 367 - Roofs and Covers

**Scenario** #1 - Flexible Roof

**Scenario Description:**

A flexible membrane or fabric-like roof placed on a steel truss hoop-like supports and supporting foundation. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve of an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A flexible membrane or fabric-like roof placed on a steel truss hoop-like supports and supporting foundation. Roof or cover will be engineered and installed in accordance with appropriate building codes and permits. Typical size is 1,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of the building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $8,220.00

**Scenario Cost/Unit:** $8.22

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Roof, Hoop Truss Arch Structure, less than 30' wide | 1667 | Hoop Truss Arch Structure with fabric cover - less than 30' width, includes materials, equipment, and installation. Does not include foundation preparation. | Square Foot | $8.22 | 1000 | $8,220.00 |

**Practice:** 367 - Roofs and Covers

**Scenario** #2 - Roof Structure, <30ft Width

**Scenario Description:**

A timber or metal framed building with a timber or steel "sheet" roof, less than 30' wide and supporting foundation with open sides. The roof structure covers manure that is stored as a liquid in basins, tanks, or as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Agrichemical Handling Facility (309), Roof Runoff Structure (558), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete or earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A timber or metal framed building with a timber or steel "sheet" roof and supporting foundation with open sides. The structure is engineered and installed in accordance with appropriate building codes and permits. Typical size is 20'WX100'L for a total 2,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation and to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $18,060.00

**Scenario Cost/Unit:** $9.03

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Roof, Post Frame Building , less than 30' wide | 1672 | Post Frame Building, no sides, - less than 30' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation preparation. | Square Foot | $9.03 | 2000 | $18,060.00 |

**Practice:** 367 - Roofs and Covers

**Scenario** #3 - Roof Structure, <30ft Width with siding

**Scenario Description:**

A timber or metal framed building with a timber or steel "sheet" roof, less than 30' wide, and supporting foundation and with siding on 2 sides of the building to prevent wind blown rain from entering on the sides of the barn. The roof structure covers manure that is stored as a liquid in basins, tanks, or as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Agrichemical Handling Facility (309), Roof Runoff Structure (558), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete or earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A timber or metal framed building with a timber or steel "sheet" roof and supporting foundation with siding on 2 sides of the building. The structure is engineered and installed in accordance with appropriate building codes and permits. Typical size is 20'WX100'L for a total 2,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation and to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $24,756.40

**Scenario Cost/Unit:** $12.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Aerial lift, telescoping bucket | 1893 | Aerial lift, bucket truck or cherry picker, typical 40' boom. Equipment only. | Hour | $41.41 | 40 | $1,656.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| **Materials** | | | | | | |
| Corrugated Steel, 22 gauge | 224 | Corrugated or ribbed, galvanized, 22 gauge, includes fasteners, materials only. | Square Foot | $2.44 | 1600 | $3,904.00 |
| Roof, Post Frame Building , less than 30' wide | 1672 | Post Frame Building, no sides, - less than 30' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation preparation. | Square Foot | $9.03 | 2000 | $18,060.00 |

**Practice:** 367 - Roofs and Covers

**Scenario** #4 - Roof Structure, 30-60ft Width

**Scenario Description:**

A timber or metal framed building with a timber or steel "sheet" roof, 30'-60' wide, and supporting foundation and with open sides. The roof structure covers manure that is stored as a liquid in basins, tanks, or as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Agrichemical Handling Facility (309), Roof Runoff Structure (558), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete or earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A timber or metal framed building with a timber or steel "sheet" roof and supporting foundation with open sides. The structure is engineered and installed in accordance with appropriate building codes and permits. Typical size is 40'WX100'L for a total 4,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation and to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,000.0

**Scenario Total Cost:** $34,480.00

**Scenario Cost/Unit:** $8.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Roof, Post Frame Building, 30' to 60' wide | 1676 | Post Frame Building, no sides, - 30' to 60' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation preparation. | Square Foot | $8.62 | 4000 | $34,480.00 |

**Practice:** 367 - Roofs and Covers

**Scenario** #5 - Roof Structure, 30-60ft Width with siding

**Scenario Description:**

A timber or metal framed building with a timber or steel "sheet" roof, 30'-60' wide, and supporting foundation and with siding on 2 sides of the building to prevent wind blown rain from entering on the sides of the barn. The roof structure covers manure that is stored as a liquid in basins, tanks, or as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Agrichemical Handling Facility (309), Roof Runoff Structure (558), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete or earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A timber or metal framed building with a timber or steel "sheet" roof and supporting foundation with siding on 2 sides of the building. The structure is engineered and installed in accordance with appropriate building codes and permits. Typical size is 40'WX100'L for a total 4,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation and to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,000.0

**Scenario Total Cost:** $41,176.40

**Scenario Cost/Unit:** $10.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Aerial lift, telescoping bucket | 1893 | Aerial lift, bucket truck or cherry picker, typical 40' boom. Equipment only. | Hour | $41.41 | 40 | $1,656.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| **Materials** | | | | | | |
| Corrugated Steel, 22 gauge | 224 | Corrugated or ribbed, galvanized, 22 gauge, includes fasteners, materials only. | Square Foot | $2.44 | 1600 | $3,904.00 |
| Roof, Post Frame Building, 30' to 60' wide | 1676 | Post Frame Building, no sides, - 30' to 60' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation preparation. | Square Foot | $8.62 | 4000 | $34,480.00 |

**Practice:** 367 - Roofs and Covers

**Scenario** #6 - Roof Structure, >60ft Width

**Scenario Description:**

A timber or metal framed building with a timber or steel "sheet" roof, >60' wide, and supporting foundation and with open sides. The roof structure covers manure that is stored as a liquid in basins, tanks, or as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Agrichemical Handling Facility (309), Roof Runoff Structure (558), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete or earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A timber or metal framed building with a timber or steel "sheet" roof and supporting foundation with open sides. The structure is engineered and installed in accordance with appropriate building codes and permits. Typical size is 80'WX100'L for a total 8,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation and to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 8,000.0

**Scenario Total Cost:** $39,920.00

**Scenario Cost/Unit:** $4.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Roof, Post Frame Building, greater than 60' wide | 1673 | Post Frame Building, no sides, - greater than 60' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation preparation. | Square Foot | $4.99 | 8000 | $39,920.00 |

**Practice:** 367 - Roofs and Covers

**Scenario** #7 - Roof Structure, >60ft Width with siding

**Scenario Description:**

A timber or metal framed building with a timber or steel "sheet" roof, >60' wide, and supporting foundation and with siding on 2 sides of the building to prevent wind blown rain from entering on the sides of the barn. The roof structure covers manure that is stored as a liquid in basins, tanks, or as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Agrichemical Handling Facility (309), Roof Runoff Structure (558), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete or earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A timber or metal framed building with a timber or steel "sheet" roof and supporting foundation with siding on 2 sides of the building. The structure is engineered and installed in accordance with appropriate building codes and permits. Typical size is 80'WX100'L for a total 8,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation and to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 8,000.0

**Scenario Total Cost:** $46,616.40

**Scenario Cost/Unit:** $5.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Aerial lift, telescoping bucket | 1893 | Aerial lift, bucket truck or cherry picker, typical 40' boom. Equipment only. | Hour | $41.41 | 40 | $1,656.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| **Materials** | | | | | | |
| Corrugated Steel, 22 gauge | 224 | Corrugated or ribbed, galvanized, 22 gauge, includes fasteners, materials only. | Square Foot | $2.44 | 1600 | $3,904.00 |
| Roof, Post Frame Building, greater than 60' wide | 1673 | Post Frame Building, no sides, - greater than 60' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation preparation. | Square Foot | $4.99 | 8000 | $39,920.00 |

**Practice:** 367 - Roofs and Covers

**Scenario** #8 - Monosloped Timber Roof

**Scenario Description:**

A mono sloped timber or metal framed building with a timber or steel "sheet" roof with 2 sides to prevent wind blown rain and supporting foundation. Monosloped structures are to be used in areas where structural requirements may not allow the use of conventional post and frame structures. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Agrichemical Handling Facility (309), Roof Runoff Structure (558), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve of an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A timber framed building with a timber or steel "sheet" roof and supporting foundation. Engineered and installed in accordance with appropriate building codes and permits. Typical size is a 270 square feet structure with a width of 15' and a length of 20' for an area of 300 sf. The back eve height is 10', the front eve height is 8', having steel sheet siding on 2 sides. Building is typically installed over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation and to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $5,748.60

**Scenario Cost/Unit:** $19.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Aerial lift, telescoping bucket | 1893 | Aerial lift, bucket truck or cherry picker, typical 40' boom. Equipment only. | Hour | $41.41 | 20 | $828.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| **Materials** | | | | | | |
| Corrugated Steel, 22 gauge | 224 | Corrugated or ribbed, galvanized, 22 gauge, includes fasteners, materials only. | Square Foot | $2.44 | 360 | $878.40 |
| Roof, Steel Frame Monoslope Building, less than 30' wide | 1680 | Steel Frame Monoslope Building, less than 30' width, includes materials, equipment, and installation. Does not include foundation preparation. | Square Foot | $11.58 | 300 | $3,474.00 |

**Practice:** 367 - Roofs and Covers

**Scenario** #9 - Flexible Membrane Cover

**Scenario Description:**

A fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester). Cover will exclude precipitation and/or capture biogas for controlled release for flaring or anaerobic digestion. Associated practices include Waste Storage Facility (313), Waste Treatment Lagoon (359), Anaerobic Digester (366), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), Pumping Plant (533), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage or treatment lagoon will improve the management of an existing or planned system, capture and controlled release or flaring of emissions from an existing or planned agricultural waste storage to improve air quality, and/or biogas production and capture for energy use are part of the existing or planned animal waste management system.

**After Situation:**

A fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester). Typical scenario is for a 200'x400' pond cover (80,000 sq ft).

**Feature Measure:** Surface of Membrane

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 80,000.0

**Scenario Total Cost:** $97,202.18

**Scenario Cost/Unit:** $1.22

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $3.11 | 1200 | $3,732.00 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 50 | $6,087.50 |
| Concrete, CIP, Slab on Grade, non reinforced | 1225 | Non reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $207.34 | 45 | $9,330.30 |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $89.84 | 20 | $1,796.80 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 310 | $8,804.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 84 | $3,373.44 |
| **Materials** | | | | | | |
| Aggregate, gravel, washed, pea gravel | 1331 | Washed and graded pea gravel river stone. Includes materials and local delivery within 20 miles of quarry. | Cubic Yard | $31.41 | 90 | $2,826.90 |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.50 | 8890 | $57,785.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 4 | $1,903.84 |

**Practice:** 367 - Roofs and Covers

**Scenario** #10 - Flexible Membrane Cover with Methane Collection System

**Scenario Description:**

A fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility with a methane capture system . The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester). Cover will exclude precipitation and capture biogas for controlled release for flaring or anaerobic digestion. Associated practices include Waste Storage Facility (313), Waste Treatment Lagoon (359), Anaerobic Digester (366), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), Pumping Plant (533), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage or treatment lagoon will improve the management of an existing or planned system, capture and controlled release or flaring of emissions from an existing or planned agricultural waste storage to improve air quality, and/or biogas production and capture for energy use are part of the existing or planned animal waste management system.

**After Situation:**

A fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire 200'X400' surface of waste (80,000 sq ft).

**Feature Measure:** Surface of Membrane

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 80,000.0

**Scenario Total Cost:** $129,126.54

**Scenario Cost/Unit:** $1.61

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $3.11 | 1200 | $3,732.00 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 40 | $4,870.00 |
| Concrete, CIP, Slab on Grade, non reinforced | 1225 | Non reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $207.34 | 45 | $9,330.30 |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $89.84 | 20 | $1,796.80 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 310 | $8,804.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 80 | $3,212.80 |
| **Materials** | | | | | | |
| Aggregate, gravel, washed, pea gravel | 1331 | Washed and graded pea gravel river stone. Includes materials and local delivery within 20 miles of quarry. | Cubic Yard | $31.41 | 90 | $2,826.90 |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.50 | 8890 | $57,785.00 |
| Covered Lagoon Gas Collection System | 1664 | Piping and collection system for biogas. Includes labor and equipment. | Each | $33,302.50 | 1 | $33,302.50 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 4 | $1,903.84 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #1 - IC Engine Repower, <= 25 bhp

**Scenario Description:**

Older diesel engine replaced with new diesel engine repower (<= 25 bhp). The existing diesel engine may be stationary or portable operating an irrigation pump, or an auxiliary engine providing mechanical function for agricultural/forestry equipment. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

An old or inefficient diesel engine powers an irrigation pumping plant or grain dryer fan, or is a backup power generation for a farming operation. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR the existing diesel engine is energy inefficient due to a conversion of the irrigation system, reduction in required pump capacity, or age of the power unit. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump, off-road agricultural vehicle or other auxiliary engine providing a mechanical function for agricultural/forestry equipment.

**After Situation:**

The repowered diesel engine (<= 25 bhp) replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no cost have been included for a new pad. Additional costs may be incurred, if a concrete pad is not present. For Air Quality: The repower diesel engine will be cleaner-burning and will emit less particulate matter and/or oxides of nitrogen than the previous existing engine. For Energy: Energy efficiency will be improved by at least 20%; the increase in energy efficiency for the modified unit must be supported by an energy analysis.

**Feature Measure:** Size of Replacement Engine

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,608.38

**Scenario Cost/Unit:** $360.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| **Materials** | | | | | | |
| Motor, IC Engine, less than 25 HP | 1427 | Most current Tier-level Diesel or Cleaner Engine and required appurtenances. Less than 25 bhp. Materials only. | Horsepower | $329.59 | 10 | $3,295.90 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #2 - IC Engine Repower, >25 bhp

**Scenario Description:**

Older diesel engine replaced with new diesel engine repower (25 bhp or more). The existing diesel engine may be stationary or portable operating an irrigation pump, or an auxiliary engine providing mechanical function for agricultural/forestry equipment. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

An old or inefficient diesel engine powers an irrigation pumping plant or grain dryer fan, or is a backup power generation for a farming operation. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR the existing diesel engine is energy inefficient due to a conversion of the irrigation system, reduction in required pump capacity, or age of the power unit. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump, off-road agricultural vehicle or other auxiliary engine providing a mechanical function for agricultural/forestry equipment.

**After Situation:**

The repowered diesel engine (average of 175 bhp) replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no cost have been included for a new pad. Additional costs may be incurred, if a concrete pad is not present. For Air Quality: The repower diesel engine will be cleaner-burning and will emit less particulate matter and/or oxides of nitrogen than the previous existing engine. For Energy: Energy efficiency will be improved by at least 20%; the increase in energy efficiency for the modified unit must be supported by an energy analysis.

**Feature Measure:** Size of Replacement Engine

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 175.0

**Scenario Total Cost:** $39,434.71

**Scenario Cost/Unit:** $225.34

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| **Materials** | | | | | | |
| Motor, IC Engine, 100-199 HP | 1430 | Most current Tier-level Diesel or Cleaner Engine and required appurtenances. 100 to 199 bhp. Materials only. | Horsepower | $221.77 | 175 | $38,809.75 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #3 - Electric Motor in-lieu of IC Engine, < 12 HP

**Scenario Description:**

Replace an existing IC engine operating an irrigation well with a new electric motor (< 12 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

Irrigation pump with diesel engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:**

The electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no cost have been included for a new pad. Additional costs may be incurred, if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Feature Measure:** Number of Combustion Units Repla

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,598.11

**Scenario Cost/Unit:** $1,598.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 10 HP | 1172 | Premium NEMA approved electric motor, 10 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $1,285.63 | 1 | $1,285.63 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #4 - Electric Motor in-lieu of IC Engine, 12-69 HP

**Scenario Description:**

Replace an existing IC engine operating an irrigation well with a new electric motor (12-69 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

Irrigation pump with diesel engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:**

The electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no cost have been included for a new pad. Additional costs may be incurred, if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Feature Measure:** Number of Combustion Units Repla

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,970.02

**Scenario Cost/Unit:** $6,970.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 12 | $468.72 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 50 HP | 1173 | Premium NEMA approved electric motor, 50 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $6,501.30 | 1 | $6,501.30 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #5 - Electric Motor in-lieu of IC Engine, 70-124 HP

**Scenario Description:**

Replace an existing IC engine operating an irrigation well with a new electric motor (70-124 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

Irrigation pump with diesel engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:**

The electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no cost have been included for a new pad. Additional costs may be incurred, if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Feature Measure:** Number of Combustion Units Repla

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $8,746.29

**Scenario Cost/Unit:** $8,746.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 100 HP | 1174 | Premium NEMA approved electric motor, 100 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $8,121.33 | 1 | $8,121.33 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #6 - Electric Motor in-lieu of IC Engine, 125-174 HP

**Scenario Description:**

Replace an existing IC engine operating an irrigation well with a new electric motor (125-174 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

Irrigation pump with diesel engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:**

The electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no cost have been included for a new pad. Additional costs may be incurred, if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Feature Measure:** Number of Combustion Units Repla

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $17,361.34

**Scenario Cost/Unit:** $17,361.34

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 24 | $937.44 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 100 HP | 1174 | Premium NEMA approved electric motor, 100 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $8,121.33 | 0.5 | $4,060.67 |
| Motor, electric, NEMA Premium, 200 HP | 1175 | Premium NEMA approved electric motor, 200 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $24,726.47 | 0.5 | $12,363.24 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #7 - Electric Motor in-lieu of IC Engine, 175-224 HP

**Scenario Description:**

Replace an existing IC engine operating an irrigation well with a new electric motor (175-224 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

Irrigation pump with diesel engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:**

The electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no cost have been included for a new pad. Additional costs may be incurred, if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Feature Measure:** Number of Combustion Units Repla

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $26,288.87

**Scenario Cost/Unit:** $26,288.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 200 HP | 1175 | Premium NEMA approved electric motor, 200 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $24,726.47 | 1 | $24,726.47 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #8 - Electric Motor in-lieu of IC Engine, 225-274 HP

**Scenario Description:**

Replace an existing IC engine operating an irrigation well with a new electric motor (225-274 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

Irrigation pump with diesel engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:**

The electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no cost have been included for a new pad. Additional costs may be incurred, if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Feature Measure:** Number of Combustion Units Repla

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $31,088.64

**Scenario Cost/Unit:** $31,088.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 200 HP | 1175 | Premium NEMA approved electric motor, 200 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $24,726.47 | 0.5 | $12,363.24 |
| Motor, electric, NEMA Premium, 300 to 399 hp | 1438 | Premium NEMA approved Electric Motor and required appurtenances. 300 to 399 hp (222 - 295 kW). Includes materials and shipping only. | Horsepower | $114.42 | 150 | $17,163.00 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #9 - Electric Motor in-lieu of IC Engine, 275-399 HP

**Scenario Description:**

Replace an existing IC engine operating an irrigation well with a new electric motor (275-399 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

Irrigation pump with diesel engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:**

The electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no cost have been included for a new pad. Additional costs may be incurred, if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Feature Measure:** Number of Combustion Units Repla

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $41,609.40

**Scenario Cost/Unit:** $41,609.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 300 to 399 hp | 1438 | Premium NEMA approved Electric Motor and required appurtenances. 300 to 399 hp (222 - 295 kW). Includes materials and shipping only. | Horsepower | $114.42 | 350 | $40,047.00 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #10 - Electric Motor in-lieu of IC Engine, 400-499 HP

**Scenario Description:**

Replace an existing IC engine operating an irrigation well with a new electric motor (400-499 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

Irrigation pump with diesel engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:**

The electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no cost have been included for a new pad. Additional costs may be incurred, if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Feature Measure:** Number of Combustion Units Repla

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $58,572.90

**Scenario Cost/Unit:** $58,572.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 400 to 499 hp | 1439 | Premium NEMA approved Electric Motor and required appurtenances. 400 to 499 hp (296 - 372 kW). Includes materials and shipping only. | Horsepower | $126.69 | 450 | $57,010.50 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #11 - Electric Motor in-lieu of IC Engine, >= 500 HP

**Scenario Description:**

Replace an existing IC engine operating an irrigation well with a new electric motor (greater than 500 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

Irrigation pump with diesel engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:**

The electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no cost have been included for a new pad. Additional costs may be incurred, if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Feature Measure:** Number of Combustion Units Repla

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $75,242.90

**Scenario Cost/Unit:** $75,242.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 500 hp and greater | 1440 | Premium NEMA approved Electric Motor and required appurtenances. 500 hp and greater (373+ kW). Includes materials and shipping only. | Horsepower | $128.14 | 575 | $73,680.50 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #18 - Smudge Pot Replacement

**Scenario Description:**

Typical scenario is the replacement of oil and/or diesel heating devices (smudge pots) in orchards with a high efficiency propane burning system to improve air quality by reducing particulate matter emissions that have negative impacts on visibility and/or human health.

**Before Situation:**

Diesel and/or oil burning smudge pots are used in orchards to provide heat and prevent freezing of blooms (smudge pot distribution is approximately 45 pots per acre). Emissions from current system result in poor visibility and/or negative effects on human health.

**After Situation:**

Installation of high efficiency heating system to control temperature. Spacing of the high efficiency system will depend upon the unit. Particulate matter air emissions are reduced and result in improved air quality.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $36,012.24

**Scenario Cost/Unit:** $3,601.22

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 4 | $156.24 |
| **Materials** | | | | | | |
| Heater, high efficiency | 1165 | Natural gas, propane, or fuel oil unit heater or boiler and venting materials. Based on input kBTU/hour. Includes materials and shipping only. | 1,000 BTU/Hour | $12.45 | 2880 | $35,856.00 |

**Practice:** 373 - Dust Control on Unpaved Roads and Surfaces

**Scenario** #1 - Water Application, Once per Day

**Scenario Description:**

Application of water via truck as a dust suppressant once per day to an unpaved road or other unpaved surface where vehicle or wind action may result in emissions of particulate matter without treatment. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The operation does not apply a dust suppressant to an unpaved surface. Vehicle or wind action on the untreated unpaved surface results in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

The unpaved surface is graded and potholes are filled three times per year. Water is applied via truck once per day as a dust suppressant to the unpaved surface with a minimization of overlap and avoidance of over-application of water. This scenario assumes a treated area of 1/4 mile in length and 12 feet in width (1320' X 12' = 15840 SqFt). Associated practices include 560 - Access Road, 472 - Access Control, 561 - Heavy Use Area Protection, 342 - Critical Area Planting, 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 516 - Pipeline, 533 - Pumping Plant, 449 - Irrigation Water Management, 484 - Mulching, and 380 - Windbreak/Shelterbelt Establishment.

**Feature Measure:** Area Treated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 15,840.0

**Scenario Total Cost:** $2,412.35

**Scenario Cost/Unit:** $0.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 132.7 | $798.85 |
| Motor Grader, 200 HP | 1782 | Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-225. Equipment cost, does not include labor. | Hour | $161.35 | 10 | $1,613.50 |

**Practice:** 373 - Dust Control on Unpaved Roads and Surfaces

**Scenario** #2 - Water Application, Twice per Day

**Scenario Description:**

Application of water via truck as a dust suppressant twice per day to an unpaved road or other unpaved surface where vehicle or wind action may result in emissions of particulate matter without treatment. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The operation does not apply a dust suppressant to an unpaved surface. Vehicle or wind action on the untreated unpaved surface results in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

The unpaved surface is graded and potholes are filled three times per year. Water is applied via truck twice per day as a dust suppressant to the unpaved surface with a minimization of overlap and avoidance of over-application of water. This scenario assumes a treated area of 1/4 mile in length and 12 feet in width. Associated practices include 560 - Access Road, 472 - Access Control, 561 - Heavy Use Area Protection, 342 - Critical Area Planting, 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 516 - Pipeline, 533 - Pumping Plant, 449 - Irrigation Water Management, 484 - Mulching, and 380 - Windbreak/Shelterbelt Establishment.

**Feature Measure:** Area Treated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 15,840.0

**Scenario Total Cost:** $3,211.81

**Scenario Cost/Unit:** $0.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 265.5 | $1,598.31 |
| Motor Grader, 200 HP | 1782 | Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-225. Equipment cost, does not include labor. | Hour | $161.35 | 10 | $1,613.50 |

**Practice:** 373 - Dust Control on Unpaved Roads and Surfaces

**Scenario** #3 - Water Application, Once per Week

**Scenario Description:**

Application of water via truck as a dust suppressant once per week to an unpaved road or other unpaved surface where vehicle or wind action may result in emissions of particulate matter without treatment. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The operation does not apply a dust suppressant to an unpaved surface. Vehicle or wind action on the untreated unpaved surface results in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

The unpaved surface is graded and potholes are filled three times per year. Water is applied via truck once per week as a dust suppressant to the unpaved surface with a minimization of overlap and avoidance of over-application of water. This scenario assumes a treated area of 1/4 mile in length and 12 feet in width. Associated practices include 560 - Access Road, 472 - Access Control, 561 - Heavy Use Area Protection, 342 - Critical Area Planting, 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 516 - Pipeline, 533 - Pumping Plant, 449 - Irrigation Water Management, 484 - Mulching, and 380 - Windbreak/Shelterbelt Establishment.

**Feature Measure:** Area Treated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 15,840.0

**Scenario Total Cost:** $1,727.28

**Scenario Cost/Unit:** $0.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 18.9 | $113.78 |
| Motor Grader, 200 HP | 1782 | Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-225. Equipment cost, does not include labor. | Hour | $161.35 | 10 | $1,613.50 |

**Practice:** 373 - Dust Control on Unpaved Roads and Surfaces

**Scenario** #4 - Petroleum-Based Road Oil Application, Once per Year

**Scenario Description:**

Application of a petroleum-based road oil as a dust suppressant once per year to an unpaved road or other unpaved surface where vehicle or wind action may result in emissions of particulate matter without treatment. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The operation does not apply a dust suppressant to an unpaved surface. Vehicle or wind action on the untreated unpaved surface results in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

The unpaved surface is graded and potholes are filled once per year. Petroleum-based road oil is applied via truck once per year as a dust suppressant to the unpaved surface with a minimization of overlap and avoidance of over-application. This scenario assumes a treated area of 1/4 mile in length and 12 feet in width. Associated practices include 560 - Access Road, 472 - Access Control, 561 - Heavy Use Area Protection, 342 - Critical Area Planting, 635 - Vegetated Treatment Area, 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 516 - Pipeline, 533 - Pumping Plant, 449 - Irrigation Water Management, 484 - Mulching, and 380 - Windbreak/Shelterbelt Establishment.

**Feature Measure:** Area Treated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 15,840.0

**Scenario Total Cost:** $4,069.72

**Scenario Cost/Unit:** $0.26

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 0.36 | $2.17 |
| Motor Grader, 200 HP | 1782 | Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-225. Equipment cost, does not include labor. | Hour | $161.35 | 5 | $806.75 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 5 | $200.80 |
| **Materials** | | | | | | |
| Chemical, dust control, road oil, petroleum-based | 1339 | Petroleum-based road oil, such as SC-250 or SC-800. Includes materials and shipping only. | Gallon | $3.40 | 900 | $3,060.00 |

**Practice:** 373 - Dust Control on Unpaved Roads and Surfaces

**Scenario** #5 - Hygroscopic Salt Application, Once per Year

**Scenario Description:**

Application of a hygroscopic salt (calcium chloride, magnesium chloride, sodium chloride, etc.) as a dust suppressant once per year to an unpaved road or other unpaved surface where vehicle or wind action may result in emissions of particulate matter without treatment. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The operation does not apply a dust suppressant to an unpaved surface. Vehicle or wind action on the untreated unpaved surface results in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

The unpaved surface is graded and potholes are filled once per year. Hygroscopic salt solution is applied via truck once per year as a dust suppressant to the unpaved surface with a minimization of overlap and avoidance of over-application. Once the dust suppressant is applied, the treated surface is compacted. This scenario assumes a treated area of 1/4 mile in length and 12 feet in width. Associated practices include 560 - Access Road, 472 - Access Control, 561 - Heavy Use Area Protection, 342 - Critical Area Planting, 635 - Vegetated Treatment Area, 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 516 - Pipeline, 533 - Pumping Plant, 449 - Irrigation Water Management, 484 - Mulching, and 380 - Windbreak/Shelterbelt Establishment.

**Feature Measure:** Area Treated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 15,840.0

**Scenario Total Cost:** $2,480.36

**Scenario Cost/Unit:** $0.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 0.36 | $2.17 |
| Roller, static, smooth, self propelled | 1392 | Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor. | Hour | $15.66 | 2 | $31.32 |
| Motor Grader, 200 HP | 1782 | Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-225. Equipment cost, does not include labor. | Hour | $161.35 | 5 | $806.75 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 7 | $281.12 |
| **Materials** | | | | | | |
| Chemical, dust control, hygroscopic salt solution | 1340 | Hygroscopic salt solution, such as calcium chloride, magnesium chloride, or sodium chloride. Materials only. | Gallon | $1.51 | 900 | $1,359.00 |

**Practice:** 373 - Dust Control on Unpaved Roads and Surfaces

**Scenario** #6 - Lignosulfonate Application, Once per Year

**Scenario Description:**

Application of an adhesive (i.e., lignosulfonate) as a dust suppressant once per year to an unpaved road or other unpaved surface where vehicle or wind action may result in emissions of particulate matter without treatment. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The operation does not apply a dust suppressant to an unpaved surface. Vehicle or wind action on the untreated unpaved surface results in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

The unpaved surface is graded and potholes are filled once per year. An adhesive, such as lignosulfonate, is applied via truck once per year as a dust suppressant to the unpaved surface with a minimization of overlap and avoidance of over-application. Once the dust suppressant is applied, the treated surface is compacted. This scenario assumes a treated area of 1/4 mile in length and 12 feet in width. Associated practices include 560 - Access Road, 472 - Access Control, 561 - Heavy Use Area Protection, 342 - Critical Area Planting, 635 - Vegetated Treatment Area, 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 516 - Pipeline, 533 - Pumping Plant, 449 - Irrigation Water Management, 484 - Mulching, and 380 - Windbreak/Shelterbelt Establishment.

**Feature Measure:** Area Treated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 15,840.0

**Scenario Total Cost:** $4,226.36

**Scenario Cost/Unit:** $0.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 0.36 | $2.17 |
| Roller, static, smooth, self propelled | 1392 | Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor. | Hour | $15.66 | 2 | $31.32 |
| Motor Grader, 200 HP | 1782 | Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-225. Equipment cost, does not include labor. | Hour | $161.35 | 5 | $806.75 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 7 | $281.12 |
| **Materials** | | | | | | |
| Chemical, dust control, adhesive, lignosulfonate | 1341 | Adhesive, such as lignosulfonate. Includes materials and shipping only. | Gallon | $3.45 | 900 | $3,105.00 |

**Practice:** 373 - Dust Control on Unpaved Roads and Surfaces

**Scenario** #7 - Petroleum Emulsion Application, Once per Year

**Scenario Description:**

Application of a petroleum emulsion as a dust suppressant once per year to an unpaved road or other unpaved surface where vehicle or wind action may result in emissions of particulate matter without treatment. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The operation does not apply a dust suppressant to an unpaved surface. Vehicle or wind action on the untreated unpaved surface results in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

The unpaved surface is graded and potholes are filled once per year. A petroleum emulsion is applied via truck once per year as a dust suppressant to the unpaved surface with a minimization of overlap and avoidance of over-application. Once the dust suppressant is applied, the treated surface is compacted. This scenario assumes a treated area of 1/4 mile in length and 12 feet in width. Associated practices include 560 - Access Road, 472 - Access Control, 561 - Heavy Use Area Protection, 342 - Critical Area Planting, 635 - Vegetated Treatment Area, 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 516 - Pipeline, 533 - Pumping Plant, 449 - Irrigation Water Management, 484 - Mulching, and 380 - Windbreak/Shelterbelt Establishment.

**Feature Measure:** Area Treated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 15,840.0

**Scenario Total Cost:** $4,892.36

**Scenario Cost/Unit:** $0.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 0.36 | $2.17 |
| Roller, static, smooth, self propelled | 1392 | Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor. | Hour | $15.66 | 2 | $31.32 |
| Motor Grader, 200 HP | 1782 | Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-225. Equipment cost, does not include labor. | Hour | $161.35 | 5 | $806.75 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 7 | $281.12 |
| **Materials** | | | | | | |
| Chemical, dust control, petroleum emulsion | 1342 | Petroleum emulsio. Includes materials and shipping only. | Gallon | $4.19 | 900 | $3,771.00 |

**Practice:** 373 - Dust Control on Unpaved Roads and Surfaces

**Scenario** #8 - Polymer Emulsion Application, Once per Year

**Scenario Description:**

Application of a polymer emulsion, such as polyacrylamide (PAM), as a dust suppressant once per year to an unpaved road or other unpaved surface where vehicle or wind action may result in emissions of particulate matter without treatment. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The operation does not apply a dust suppressant to an unpaved surface. Vehicle or wind action on the untreated unpaved surface results in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

The unpaved surface is graded and potholes are filled once per year. A polymer emulsion is applied via truck once per year as a dust suppressant to the unpaved surface with a minimization of overlap and avoidance of over-application. Once the dust suppressant is applied, the treated surface is compacted. This scenario assumes a treated area of 1/4 mile in length and 12 feet in width. Associated practices include 560 - Access Road, 472 - Access Control, 450 - Anionic Polyacrylamide (PAM) Application, 561 - Heavy Use Area Protection, 342 - Critical Area Planting, 635 - Vegetated Treatment Area, 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 516 - Pipeline, 533 - Pumping Plant, 449 - Irrigation Water Management, 484 - Mulching, and 380 - Windbreak/Shelterbelt Establishment.

**Feature Measure:** Area Treated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 15,840.0

**Scenario Total Cost:** $4,712.36

**Scenario Cost/Unit:** $0.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 0.36 | $2.17 |
| Roller, static, smooth, self propelled | 1392 | Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor. | Hour | $15.66 | 2 | $31.32 |
| Motor Grader, 200 HP | 1782 | Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-225. Equipment cost, does not include labor. | Hour | $161.35 | 5 | $806.75 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 7 | $281.12 |
| **Materials** | | | | | | |
| Chemical, dust control, polymer emulsion, tanker purchase | 1343 | Polymer emulsion, such as polyacrylamide purchased in bulk. Includes materials and shipping only. | Gallon | $3.99 | 900 | $3,591.00 |

**Practice:** 373 - Dust Control on Unpaved Roads and Surfaces

**Scenario** #9 - Clay Additive Application, Once per Year

**Scenario Description:**

Application of a clay additive as a dust suppressant once per 5 years to an unpaved road or other unpaved surface where vehicle or wind action may result in emissions of particulate matter without treatment. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The operation does not apply a dust suppressant to an unpaved surface. Vehicle or wind action on the untreated unpaved surface results in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

The unpaved surface is graded and potholes are filled prior to the application. A clay additive is applied once per 5 years as a dust suppressant to the unpaved surface and mixed into the surface with a water application and road grading or other mechanical mixing. This scenario assumes a treated area of 1/4 mile in length and 12 feet in width. Associated practices include 560 - Access Road, 472 - Access Control, 561 - Heavy Use Area Protection, 342 - Critical Area Planting, 635 - Vegetated Treatment Area, 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 516 - Pipeline, 533 - Pumping Plant, 449 - Irrigation Water Management, 484 - Mulching, and 380 - Windbreak/Shelterbelt Establishment.

**Feature Measure:** Area Treated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 15,840.0

**Scenario Total Cost:** $30,094.25

**Scenario Cost/Unit:** $1.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 0.36 | $2.17 |
| Motor Grader, 200 HP | 1782 | Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-225. Equipment cost, does not include labor. | Hour | $161.35 | 8 | $1,290.80 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| **Materials** | | | | | | |
| Bentonite | 41 | Bentonite, includes materials (50# bag) | Each | $22.25 | 1280 | $28,480.00 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #1 - Ventilation - Exhaust

**Scenario Description:**

Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS Lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. Practice certification will be through receipts and pictures from the applicant. Typical scenario includes the replacement of a 48" fan.

**Before Situation:**

Inefficient ventilation in an agricultural building.

**After Situation:**

High-efficiency ventilation system which reduces energy use. The new ventilation equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing ventilation system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,500.76

**Scenario Cost/Unit:** $1,500.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 3 | $117.18 |
| **Materials** | | | | | | |
| Fan, exhaust, 48" High Efficiency | 1187 | 48 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials only. | Each | $1,383.58 | 1 | $1,383.58 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #2 - Ventilation - HAF

**Scenario Description:**

A system of fans are installed to create a horizontal air circulation pattern; the new system promotes efficient heat and moisture distribution. In a typical 10,000 square foot greenhouse, 10 HAF fans are needed. Fan performance meets Energy Audit efficiency criteria as tested by AMCA or BESS Labs.

**Before Situation:**

Inefficient air circulation system in a greenhouse.

**After Situation:**

High-efficiency air circulation system which reduces energy use. The new equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $238.35

**Scenario Cost/Unit:** $238.35

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| **Materials** | | | | | | |
| Fan, HAF, 1/10 to 1/15 HP | 1189 | High efficiency Horizontal Air Flow (HAF) fan, controls, wiring, and associated appurtenances. Materials only. | Each | $160.23 | 1 | $160.23 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #3 - Plate Cooler

**Scenario Description:**

The installation of all stainless steel dual pass plate cooler, type 316 stainless steel. Practice certification will be through receipts and pictures from the applicant.

**Before Situation:**

Inefficient milk cooling (minimal pre-cooling of milk before entering the bulk tank).

**After Situation:**

High-efficiency milk cooling system which reduces energy use. The new milk cooling equipment will pre-cool the milk and reduce overall power requirements (kW) compared to the existing milk cooling system (where most of the cooling was accomplished in the bulk tank) as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,269.14

**Scenario Cost/Unit:** $7,269.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| **Materials** | | | | | | |
| Plate Cooler, 750 - 999 gal/hr capacity | 1178 | Stainless Steel, dual pass plate cooler with 750 - 999 gallon/hour capacity. Includes materials and shipping only. | Each | $6,956.66 | 1 | $6,956.66 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #4 - Scroll Compressor

**Scenario Description:**

Install a new scroll compressor, associated controls, wiring, and materials to retrofit an existing refrigeration system. A new condenser is not included in this typical scenario. Typical scenario includes a new 5 horsepower scroll compressor.

**Before Situation:**

Inefficient reciprocating compressor as a key component of the refrigeration system used to cool milk. The compressor is a critical part of a milk cooling system, affecting milk quality, system reliability, and system efficiency.

**After Situation:**

A more efficient scroll compressor, which will reduce energy use, is evidenced by the energy audit. A comparably sized scroll compressor provides refrigeration capacity at a higher efficiency than a reciprocating compressor. Newer scroll compressor systems typically reduce electricity use by 15 to 25 percent compared to reciprocating compressors. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Horse Power

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $4,451.37

**Scenario Cost/Unit:** $890.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 4 | $156.24 |
| **Materials** | | | | | | |
| Scroll Compressor - 5 HP | 1183 | Scroll compressor, 5 Horsepower, controls, wiring, and appurtenances. Materials only. | Each | $4,295.13 | 1 | $4,295.13 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #5 - Variable Speed Drive > 5 HP

**Scenario Description:**

The typical scenario consists of a variable speed drive (VSD) and appurtenances, such as hook-ups, control panels, wiring, control blocks, filters, switches, pads, etc. attached to an electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production. The motor size, on which the VSD is added, is larger than 5 HP.

**Before Situation:**

The system is inefficient when a motor operates at constant speed to satisfy a load which varies as to flow rate and/or pressure requirements.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of a VSD to control electric motors. After the VSD is applied, the motor speed can be adjusted to reduce power requirements and better match varied flow or pressure requirements. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Motor Horsepower

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $12,698.48

**Scenario Cost/Unit:** $253.97

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| **Materials** | | | | | | |
| Variable Speed Drive, 50 HP | 1288 | Variable speed drive for 50 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $247.72 | 50 | $12,386.00 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #6 - Automatic Controller System

**Scenario Description:**

The typical scenario consists of an automatic control system installed on an existing manually controlled agricultural system. Typical components may include any of the following: wiring, sensors, data logger, logic controller, communication link, software, switches, and relay.

**Before Situation:**

A manually controlled system is existing in an agricultural facility that causes the inefficient use of energy, as evidenced by an on-farm energy audit.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of an automatic controller that helps regulates the energy consumption of the existing system. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each system

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,606.76

**Scenario Cost/Unit:** $1,606.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| **Materials** | | | | | | |
| Switches and Controls, temp sensors | 1192 | Temperature and soil moisture sensors installed as part of an electronic monitoring (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $666.86 | 1 | $666.86 |
| Switches and Controls, programmable controller | 1193 | Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $170.29 | 1 | $170.29 |
| Switches and Controls, Wi-Fi system and software | 1194 | Software with built-in cellular or Wi-Fi communication commonly used to control pumps and irrigation systems | Each | $457.13 | 1 | $457.13 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #7 - Motor Upgrade > 100 HP

**Scenario Description:**

The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is larger than 100 horsepower.

**Before Situation:**

The system is inefficient with a standard efficiency motor.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium efficiency motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $25,351.43

**Scenario Cost/Unit:** $25,351.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 200 HP | 1175 | Premium NEMA approved electric motor, 200 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $24,726.47 | 1 | $24,726.47 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #8 - Motor Upgrade 10 - 100 HP

**Scenario Description:**

The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is equal to or larger than 10 and less than or equal to 100 horsepower.

**Before Situation:**

The system is inefficient with a standard efficiency motor.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium efficiency motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,813.78

**Scenario Cost/Unit:** $6,813.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 50 HP | 1173 | Premium NEMA approved electric motor, 50 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $6,501.30 | 1 | $6,501.30 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #9 - Motor Upgrade > 1 and < 10 HP

**Scenario Description:**

The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is larger than 1 and less than 10 horsepower.

**Before Situation:**

The system is inefficient with a standard efficiency motor.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium efficiency motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $970.15

**Scenario Cost/Unit:** $970.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 4 | $156.24 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 5 HP | 1171 | Premium NEMA approved electric motor, 5 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $813.91 | 1 | $813.91 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #10 - Motor Upgrade <= 1 HP

**Scenario Description:**

The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is less than or equal to 1 horsepower.

**Before Situation:**

The system is inefficient with a standard efficiency motor.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium efficiency motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $654.85

**Scenario Cost/Unit:** $654.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 4 | $156.24 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 1 HP | 1169 | Premium NEMA approved electric motor, 1 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $498.61 | 1 | $498.61 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #11 - Heating - Radiant Systems

**Scenario Description:**

Replace "pancake" Brood Heaters in a poultry house with Radiant Tube Heaters, or similar. Replacement will require the materials and labor to remove existing heating system, re-plumb gas lines, cables and wench system to retrofit new radiant tube heaters, and miscellaneous items to complete the installation. Alternate acceptable radiant heating systems can include radiant brooders and quad radiant systems as evidenced by the energy audit. The typical scenario consists of the replacement of 28 brood heaters with 6 radiant tube heaters.

**Before Situation:**

Inefficient heat distribution equipment, such as conventional "pancake" brood heaters. The Pancake brooder, mounted at a low installation height, primarily warms the air. They provide a one-to-two foot perimeter at desired temperatures around each brooder. A large number of brooders are required to cover a significant percent of floor space. As the warmed air naturally rises it loses effectiveness for poultry on the ground.

**After Situation:**

Energy use is reduced through installation of a more efficient heater. Radiant tube heaters primarily warm objects within a direct line of sight (similar to the sun or an open fire). Air temperature is of relatively little importance for a radiant heating systems to be effective. As a result, radiant systems are typically installed 5' or more above the floor level. This height extends the distribution of the radiant heat over a larger area than is possible with pancake style heaters. A roughly 16' diameter radiant heat zone heats over twice that of a conventional pancake brooder. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 6.0

**Scenario Total Cost:** $9,847.44

**Scenario Cost/Unit:** $1,641.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| **Materials** | | | | | | |
| Heater, radiant tube | 1163 | Radiant tube heater rated at 125,000 BTU/hour. Materials only. | Each | $1,537.08 | 6 | $9,222.48 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #12 - Heating (Building)

**Scenario Description:**

Replace existing low efficiency heaters with new high efficiency heaters. High-efficiency heating systems include any heating unit with efficiency rating of 80%+ for fuel oil and 90%+ for natural gas and propane. Applications may be air heating/building environment and hydronic (boiler) heating for agricultural operations, including under bench, or root zone heating. An alternative to heater replacement might be the addition of climate control system and electronic temperature controls with +/- 1 degree F differential, to reduce the annual run time.

**Before Situation:**

Buildings heated with low efficiency heaters or heaters without proper electronic climate controls

**After Situation:**

Higher efficiency heaters reduce energy consumption, energy costs, and GHG emissions. These replacement systems can be fueled by natural gas, propane, or fuel oil. Associated practices/activities: 122-AgEMP - HQ and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Rated Heat Output

**Scenario Unit::** 1,000 BTU/Hour

**Scenario Typical Size:** 750.0

**Scenario Total Cost:** $9,962.46

**Scenario Cost/Unit:** $13.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| **Materials** | | | | | | |
| Heater, high efficiency | 1165 | Natural gas, propane, or fuel oil unit heater or boiler and venting materials. Based on input kBTU/hour. Includes materials and shipping only. | 1,000 BTU/Hour | $12.45 | 750 | $9,337.50 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #13 - Heating - Attic Heat Recovery vents

**Scenario Description:**

Install actuated inlets or automatic latching gravity inlets that draw warmer, drier air from the attic to assist with moisture and heat control when ventilation fans are being operated in poultry houses and swine barns. Other systems to transfer heat, as detailed in ASABE S612-compliant energy audit may also be used. Based on a 40' x 500' poultry house.

**Before Situation:**

Heated buildings with attic spaces but no means to transfer heat between the heated space, attic, and ambient (outside) air when relative conditions allow for reduced energy use.

**After Situation:**

Attic vents or inlets allow dry warm air from the attic to circulated through out the building. By using pre-warmed air from the attic less energy is needed for heating 122-AgEMP - HQ and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each inlet

**Scenario Unit::** Each

**Scenario Typical Size:** 14.0

**Scenario Total Cost:** $2,478.42

**Scenario Cost/Unit:** $177.03

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 24 | $937.44 |
| **Materials** | | | | | | |
| Inlet, Attic Ceiling | 2414 | Poultry house attic air inlets. Includes materials only. | Each | $110.07 | 14 | $1,540.98 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #14 - Grain Dryer

**Scenario Description:**

A replacement continuous dryer rated for an appropriate rated bushel/per hour capacity for the operation that includes a microcomputer-based control system that adjusts the amount of time the crop remains in the dryer in order to achieve a consistent and accurate moisture content in the dried product. Alternate types of replacement dryers which reduce energy use are acceptable as evidenced by the energy audit. The typical operation requires a rated capacity of 860 bushels per hour.

**Before Situation:**

Wet crop is loaded in the top of a horizontal, continuous dryer. Dried crop is augured from the bottom of the dryer. The heated air from the unit's burners passes from the burner plenum through the grain. An on-farm energy audit has identified inefficient manual control of the dryer where the operator controls the plenum temperature and the discharge auger speed to achieve the desired final moisture content. Moisture content is based on measurement of grain leaving the dryer. The plenum temperature setting depends on the moisture content of crop with a typical value of 220 F. The burner cycles on and off, automatically, as necessary to maintain the plenum temperature selected by the operator.

**After Situation:**

Energy use is reduced through installation of a more efficient continuous dryer that uses a microcomputer-based controller to reduce over drying and total time of operation. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Rated capacity of the dryer

**Scenario Unit::** Bushel per Hour

**Scenario Typical Size:** 860.0

**Scenario Total Cost:** $78,274.36

**Scenario Cost/Unit:** $91.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| **Materials** | | | | | | |
| Grain dryer, Axial, 16' | 1159 | Grain dryer, 16 foot Axial with rated capacity of 600 bushels/hour. Materials only. | Bushel per Hour | $90.29 | 860 | $77,649.40 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #15 - Washer-extractor

**Scenario Description:**

For hygiene, dairies utilize wash-clothes during milking that require frequent washing and drying. The proposed washer-extractors use less energy when compared to conventional systems.

**Before Situation:**

Other methods for maintaining hygiene of dairy milking cows, or no hygiene is practiced.

**After Situation:**

A single washer-extractor unit is capable of cleaning and removing most of the moisture from over 800 lbs (dry load capacity) daily.

**Feature Measure:** Rated capacity of the unit.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $8,553.23

**Scenario Cost/Unit:** $8,553.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| **Materials** | | | | | | |
| Washer Extractor | 2489 | Non-residential; 30 to 40 pound capacity (dry load); 4.3 - 6.0 cu.ft. (cylinder volume); minimum Modified Energy Factor (MEF) no lower than 2.2 (CuFt/kWh)/Cycle. Includes materials and shipping only. | Each | $8,240.75 | 1 | $8,240.75 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #16 - Water heater

**Scenario Description:**

On dairies there is need to heat water and/or milk and cool milk and/or other dairy products. These systems are energy efficient since they use less energy input to accomplish heating and cooling when compared to conventional heating and cooling systems.

**Before Situation:**

Other methods for maintaining heating and/or cooling of water.

**After Situation:**

Use of a heat pump significantly reduces the energy required for heating and/or cooling.

**Feature Measure:** Rated capacity of the unit.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $312.58

**Scenario Cost/Unit:** $312.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| **Materials** | | | | | | |
| Water Heater (Water-Source Heat Pump) | 2488 | Energy efficient industrial heat pump systems used for heating and/or cooling of water. | BTU | $0.10 | 1 | $0.10 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #17 - Compressor heat recovery

**Scenario Description:**

On dairies there is need to heat water and/or milk and cool milk and/or other dairy products. These systems are energy efficient since they use less energy input to accomplish heating and cooling when compared to conventional heating and cooling systems. A heat exchangers (compressor heat recovery system) are used to cool milk following heating processes and to cool warm milk yet to be processed. Use of the heat exchangers reduces the need for additional energy to carry out each of these processes.

**Before Situation:**

Other refrigeration methods.

**After Situation:**

Use of a compressor heat recovery unit significantly reduces the energy required for heating and/or cooling. Scenario is for the installation of 1 Compressor heat recovery unit, typically rated at 1,000 BTU/Hour

**Feature Measure:** Number of heating units

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,018.61

**Scenario Cost/Unit:** $4,018.61

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| **Materials** | | | | | | |
| Compressor heat recovery (CHR) unit, High Efficiency | 1899 | Compressor heat recovery (CHR) units (insulated storage tanks with heat exchangers) added to a refrigeration system, use the heat extracted from a warm fluid (e.g., milk) that passes through the hot gas refrigerant line from the refrigeration system's compressors, to pre-heat water to approximately 110°F before it enters a conventional water heater. Energy savings comes from the reduced heating required in a water heater. Low ambient controls and/or condenser variable speed drives are part of the installation. The actual number of heat recovery units and their location will depend on the operating hours of the compressor and the configuration of the existing system. | Each | $3,706.13 | 1 | $3,706.13 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #18 - Alley Scraper

**Scenario Description:**
Install an electric-powered alley scraper system to replace the use of tractors for scraping manure in barn alley-ways.

**Before Situation:**
A tractor is used to scrape manure from barn alley-ways. For the typical system, this consumes over 435 million BTUs per year.

**After Situation:**
For the same function, a typical electric-powered alley scraper system consumes 153 million BTUs per year.

**Feature Measure:** Scraper System

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $28,740.90

**Scenario Cost/Unit:** $28,740.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 240 | $9,374.40 |
| **Materials** | | | | | | |
| Scraper, alley | 2611 | A "V" shaped mechanical blade that is dragged over an alley by chain or cable to pull manure to collection channel at the end of the alley (or possibly the center of the barn). The blade then collapses and is drawn back to the opposite end of the alley. This is for a 200 foot barn with 2 alleys and 2 scrapers, and a 1HP drive unit. Includes materials and shipping only. | Each | $19,366.50 | 1 | $19,366.50 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #19 - Condenser

**Scenario Description:**

Install an air or water cooled condenser, associated controls, wiring, and materials to retrofit an existing refrigeration system. Typical scenario includes a new 30 horsepower condenser.

**Before Situation:**

Inefficient condenser as a key component of the refrigeration system used to cool milk. The condenser is a critical part of a milk cooling system, affecting milk quality, system reliability, and system efficiency.

**After Situation:**

A more efficient air or water cooled condenser and overall refrigeration system, which will reduce energy use. Evaporative cooled condensers can save energy through reduction in energy needed for pumping water in traditional ground-cooled condensers and through a lowered saturated discharge temperature. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Replacement of former system

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $23,940.78

**Scenario Cost/Unit:** $798.03

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| **Materials** | | | | | | |
| Refrigeration/Condensor Unit | 2632 | Air or water cooled condensor with floating head presure controls. Includes materials and shipping only. | Each | $22,378.38 | 1 | $22,378.38 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #1 - Manure Harvesting - Once per Year

**Scenario Description:**

Removal of loose, dry layer of manure from a confined animal operation once per year in addition to a regular annual manure clean-out to reduce emissions of particulate matter. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, an additional manure harvesting removes the dry, loose manure layer from the pens and working alleys. This manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $488.64

**Scenario Cost/Unit:** $488.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 3 | $169.92 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 3 | $156.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 6 | $162.72 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #2 - Manure Harvesting - Twice per Year

**Scenario Description:**

Removal of loose, dry layer of manure from a confined animal operation twice per year in addition to a regular annual manure clean-out to reduce emissions of particulate matter. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, two additional manure harvesting efforts remove the dry, loose manure layer from the pens and working alleys. Each manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $977.28

**Scenario Cost/Unit:** $977.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 6 | $339.84 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 6 | $312.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 12 | $325.44 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #3 - Manure Harvesting - More Than Twice per Year

**Scenario Description:**

Removal of loose, dry layer of manure from a confined animal operation more than twice per year in addition to a regular annual manure clean-out to reduce emissions of particulate matter. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, four additional manure harvesting efforts remove the dry, loose manure layer from the pens and working alleys. Each manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,954.56

**Scenario Cost/Unit:** $1,954.56

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 12 | $679.68 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 12 | $624.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 24 | $650.88 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #4 - Solid-Set Sprinkler System, Less than 20 Acres

**Scenario Description:**

Installation of a solid-set dust control sprinkler system on a confined animal operation with a pen and working alley area of less than 20 acres. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined beef feedlot does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

A solid-set dust control sprinkler system is installed to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/alley from animal manure and urine. The system is designed to avoid excessive overlap and over-application of water. This scenario has a typical pen/alley area of 15 acres. Associated practices include 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 442 - Irrigation System, Sprinkler, 516 - Pipeline, and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $219,312.45

**Scenario Cost/Unit:** $14,620.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dust Control, Open Lot Solid Set Sprinkler System, w/Appurtenances, < 20 Acres | 1344 | Solid set sprinkler system for dust control on open lot livestock pens, less than 20 acres, w/appurtenances and including complete labor and installation. | Acre | $14,620.83 | 15 | $219,312.45 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #5 - Solid-Set Sprinkler System, 20-60 Acres

**Scenario Description:**

Installation of a solid-set dust control sprinkler system on a confined animal operation with a pen and working alley area of 20-60 acres. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined beef feedlot does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

A solid-set dust control sprinkler system is installed to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/alley from animal manure and urine. The system is designed to avoid excessive overlap and over-application of water. This scenario has a typical pen/alley area of 35 acres. Associated practices include 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 442 - Irrigation System, Sprinkler, 516 - Pipeline, and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 35.0

**Scenario Total Cost:** $385,458.50

**Scenario Cost/Unit:** $11,013.10

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dust Control, Open Lot Solid Set Sprinkler System, w/Appurtenances, 20 to 60 Acres | 1345 | Solid set sprinkler system for dust control on open lot livestock pens, 20-60 acres, w/appurtenances and including complete labor and installation | Acre | $11,013.10 | 35 | $385,458.50 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #6 - Solid-Set Sprinkler System, Greater than 60 Acres

**Scenario Description:**

Installation of a solid-set dust control sprinkler system on a confined animal operation with a pen and working alley area of greater than 60 acres. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined beef feedlot does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

A solid-set dust control sprinkler system is installed to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/alley from animal manure and urine. The system is designed to avoid excessive overlap and over-application of water. This scenario has a typical pen/alley area of 100 acres. Associated practices include 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 442 - Irrigation System, Sprinkler, 516 - Pipeline, and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $665,144.00

**Scenario Cost/Unit:** $6,651.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dust Control, Open Lot Solid Set Sprinkler System, w/Appurtenances, > 60 Acres | 1346 | Solid set sprinkler system for dust control on open lot livestock pens, greater than 60 acres, w/appurtenances and including complete labor and installation | Acre | $6,651.44 | 100 | $665,144.00 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #7 - Truck-Mounted Mobile Sprinkler System

**Scenario Description:**

Use of a mobile truck-mounted sprinkler on a confined animal operation. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined beef feedlot does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

A mobile truck-mounted sprinkler is used once per day to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/working alleys from animal manure and urine. The application is intended to avoid excessive overlap and over-application of water. Associated practices include 436 - Irrigation Reservoir and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,197.30

**Scenario Cost/Unit:** $2,197.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 365 | $2,197.30 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #8 - Manure Harvest-1 per Year and Solid-Set Sprinkler System, Less than 20 Acres

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation once per year in addition to a regular annual manure clean-out and installation of a solid-set dust control sprinkler system on a confined animal operation with a pen and working alley area of less than 20 acres. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, an additional manure harvesting removes the dry, loose manure layer from the pens and working alleys. This manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. A solid-set dust control sprinkler system is also installed to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/alley from animal manure and urine. The system is designed to avoid excessive overlap and over-application of water. This scenario has a typical pen/alley area of 15 acres. Associated practices include 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 442 - Irrigation System, Sprinkler, 516 - Pipeline, and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $226,642.05

**Scenario Cost/Unit:** $15,109.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 45 | $2,548.80 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 45 | $2,340.00 |
| Dust Control, Open Lot Solid Set Sprinkler System, w/Appurtenances, < 20 Acres | 1344 | Solid set sprinkler system for dust control on open lot livestock pens, less than 20 acres, w/appurtenances and including complete labor and installation. | Acre | $14,620.83 | 15 | $219,312.45 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 90 | $2,440.80 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #9 - Manure Harvest-1 per Year and Solid-Set Sprinkler System, 20-60 Acres

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation once per year in addition to a regular annual manure clean-out and installation of a solid-set dust control sprinkler system on a confined animal operation with a pen and working alley area of 20-60 acres. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, an additional manure harvesting removes the dry, loose manure layer from the pens and working alleys. This manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. A solid-set dust control sprinkler system is also installed to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/alley from animal manure and urine. The system is designed to avoid excessive overlap and over-application of water. This scenario has a typical pen/alley area of 35 acres. Associated practices include 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 442 - Irrigation System, Sprinkler, 516 - Pipeline, and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 35.0

**Scenario Total Cost:** $402,560.90

**Scenario Cost/Unit:** $11,501.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 105 | $5,947.20 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 105 | $5,460.00 |
| Dust Control, Open Lot Solid Set Sprinkler System, w/Appurtenances, 20 to 60 Acres | 1345 | Solid set sprinkler system for dust control on open lot livestock pens, 20-60 acres, w/appurtenances and including complete labor and installation | Acre | $11,013.10 | 35 | $385,458.50 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 210 | $5,695.20 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #10 - Manure Harvest-1 per Year and Solid-Set Sprinkler System, Greater than 60 Acres

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation once per year in addition to a regular annual manure clean-out and installation of a solid-set dust control sprinkler system on a confined animal operation with a pen and working alley area of greater than 60 acres. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, an additional manure harvesting removes the dry, loose manure layer from the pens and working alleys. This manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. A solid-set dust control sprinkler system is also installed to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/alley from animal manure and urine. The system is designed to avoid excessive overlap and over-application of water. This scenario has a typical pen/alley area of 100 acres. Associated practices include 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 442 - Irrigation System, Sprinkler, 516 - Pipeline, and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $714,008.00

**Scenario Cost/Unit:** $7,140.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 300 | $16,992.00 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 300 | $15,600.00 |
| Dust Control, Open Lot Solid Set Sprinkler System, w/Appurtenances, > 60 Acres | 1346 | Solid set sprinkler system for dust control on open lot livestock pens, greater than 60 acres, w/appurtenances and including complete labor and installation | Acre | $6,651.44 | 100 | $665,144.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 600 | $16,272.00 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #11 - Manure Harvest-1 per Year and Truck-Mounted Mobile Sprinkler System

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation once per year in addition to a regular annual manure clean-out and use of a mobile truck-mounted sprinkler on a confined animal operation. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, an additional manure harvesting removes the dry, loose manure layer from the pens and working alleys. This manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. A mobile truck-mounted sprinkler is used once per day to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/working alleys from animal manure and urine. The application is intended to avoid excessive overlap and over-application of water. Associated practices include 436 - Irrigation Reservoir and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,685.94

**Scenario Cost/Unit:** $2,685.94

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 365 | $2,197.30 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 3 | $169.92 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 3 | $156.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 6 | $162.72 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #12 - Manure Harvest-2 per Year and Solid-Set Sprinkler System, Less than 20 Acres

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation twice per year in addition to a regular annual manure clean-out and installation of a solid-set dust control sprinkler system on a confined animal operation with a pen and working alley area of less than 20 acres. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, two additional manure harvesting efforts remove the dry, loose manure layer from the pens and working alleys. Each manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. A solid-set dust control sprinkler system is also installed to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/alley from animal manure and urine. The system is designed to avoid excessive overlap and over-application of water. This scenario has a typical pen/alley area of 15 acres. Associated practices include 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 442 - Irrigation System, Sprinkler, 516 - Pipeline, and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $233,971.65

**Scenario Cost/Unit:** $15,598.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 90 | $5,097.60 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 90 | $4,680.00 |
| Dust Control, Open Lot Solid Set Sprinkler System, w/Appurtenances, < 20 Acres | 1344 | Solid set sprinkler system for dust control on open lot livestock pens, less than 20 acres, w/appurtenances and including complete labor and installation. | Acre | $14,620.83 | 15 | $219,312.45 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 180 | $4,881.60 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #13 - Manure Harvest-2 per Year and Solid-Set Sprinkler System, 20-60 Acres

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation twice per year in addition to a regular annual manure clean-out and installation of a solid-set dust control sprinkler system on a confined animal operation with a pen and working alley area of 20-60 acres. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, two additional manure harvesting efforts remove the dry, loose manure layer from the pens and working alleys. Each manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. A solid-set dust control sprinkler system is also installed to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/alley from animal manure and urine. The system is designed to avoid excessive overlap and over-application of water. This scenario has a typical pen/alley area of 35 acres. Associated practices include 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 442 - Irrigation System, Sprinkler, 516 - Pipeline, and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 35.0

**Scenario Total Cost:** $419,663.30

**Scenario Cost/Unit:** $11,990.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 210 | $11,894.40 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 210 | $10,920.00 |
| Dust Control, Open Lot Solid Set Sprinkler System, w/Appurtenances, 20 to 60 Acres | 1345 | Solid set sprinkler system for dust control on open lot livestock pens, 20-60 acres, w/appurtenances and including complete labor and installation | Acre | $11,013.10 | 35 | $385,458.50 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 420 | $11,390.40 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #14 - Manure Harvest-2 per Year and Solid-Set Sprinkler System, Greater than 60 Acres

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation twice per year in addition to a regular annual manure clean-out and installation of a solid-set dust control sprinkler system on a confined animal operation with a pen and working alley area of greater than 60 acres. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, two additional manure harvesting efforts remove the dry, loose manure layer from the pens and working alleys. Each manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. A solid-set dust control sprinkler system is also installed to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/alley from animal manure and urine. The system is designed to avoid excessive overlap and over-application of water. This scenario has a typical pen/alley area of 100 acres. Associated practices include 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 442 - Irrigation System, Sprinkler, 516 - Pipeline, and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $762,872.00

**Scenario Cost/Unit:** $7,628.72

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 600 | $33,984.00 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 600 | $31,200.00 |
| Dust Control, Open Lot Solid Set Sprinkler System, w/Appurtenances, > 60 Acres | 1346 | Solid set sprinkler system for dust control on open lot livestock pens, greater than 60 acres, w/appurtenances and including complete labor and installation | Acre | $6,651.44 | 100 | $665,144.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1200 | $32,544.00 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #15 - Manure Harvest-2 per Year and Truck-Mounted Mobile Sprinkler System

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation twice per year in addition to a regular annual manure clean-out and use of a mobile truck-mounted sprinkler on a confined animal operation. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, two additional manure harvesting efforts remove the dry, loose manure layer from the pens and working alleys. Each manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. A mobile truck-mounted sprinkler is used once per day to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/working alleys from animal manure and urine. The application is intended to avoid excessive overlap and over-application of water. Associated practices include 436 - Irrigation Reservoir and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,174.58

**Scenario Cost/Unit:** $3,174.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 365 | $2,197.30 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 6 | $339.84 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 6 | $312.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 12 | $325.44 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #16 - Manure Harvest-More Than Twice per Year and Solid-Set Sprinkler System, Less than 20 Acres

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation more than twice per year in addition to a regular annual manure clean-out and installation of a solid-set dust control sprinkler system on a confined animal operation with a pen and working alley area of less than 20 acres. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, four additional manure harvesting efforts remove the dry, loose manure layer from the pens and working alleys. Each manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. A solid-set dust control sprinkler system is also installed to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/alley from animal manure and urine. The system is designed to avoid excessive overlap and over-application of water. This scenario has a typical pen/alley area of 15 acres. Associated practices include 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 442 - Irrigation System, Sprinkler, 516 - Pipeline, and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $248,630.85

**Scenario Cost/Unit:** $16,575.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 180 | $10,195.20 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 180 | $9,360.00 |
| Dust Control, Open Lot Solid Set Sprinkler System, w/Appurtenances, < 20 Acres | 1344 | Solid set sprinkler system for dust control on open lot livestock pens, less than 20 acres, w/appurtenances and including complete labor and installation. | Acre | $14,620.83 | 15 | $219,312.45 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 360 | $9,763.20 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #17 - Manure Harvest-More Than Twice per Year and Solid-Set Sprinkler System, 20-60 Acres

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation more than twice per year in addition to a regular annual manure clean-out and installation of a solid-set dust control sprinkler system on a confined animal operation with a pen and working alley area of 20-60 acres. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, four additional manure harvesting efforts remove the dry, loose manure layer from the pens and working alleys. Each manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. A solid-set dust control sprinkler system is also installed to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/alley from animal manure and urine. The system is designed to avoid excessive overlap and over-application of water. This scenario has a typical pen/alley area of 35 acres. Associated practices include 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 442 - Irrigation System, Sprinkler, 516 - Pipeline, and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 35.0

**Scenario Total Cost:** $453,868.10

**Scenario Cost/Unit:** $12,967.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 420 | $23,788.80 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 420 | $21,840.00 |
| Dust Control, Open Lot Solid Set Sprinkler System, w/Appurtenances, 20 to 60 Acres | 1345 | Solid set sprinkler system for dust control on open lot livestock pens, 20-60 acres, w/appurtenances and including complete labor and installation | Acre | $11,013.10 | 35 | $385,458.50 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 840 | $22,780.80 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #18 - Manure Harvest-More Than Twice per Year and Solid-Set Sprinkler System, Greater than 60 Acres

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation more than twice per year in addition to a regular annual manure clean-out and installation of a solid-set dust control sprinkler system on a confined animal operation with a pen and working alley area of greater than 60 acres. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, four additional manure harvesting efforts remove the dry, loose manure layer from the pens and working alleys. Each manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. A solid-set dust control sprinkler system is also installed to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/alley from animal manure and urine. The system is designed to avoid excessive overlap and over-application of water. This scenario has a typical pen/alley area of 100 acres. Associated practices include 430 - Irrigation Pipeline, 436 - Irrigation Reservoir, 442 - Irrigation System, Sprinkler, 516 - Pipeline, and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $860,600.00

**Scenario Cost/Unit:** $8,606.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 1200 | $67,968.00 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 1200 | $62,400.00 |
| Dust Control, Open Lot Solid Set Sprinkler System, w/Appurtenances, > 60 Acres | 1346 | Solid set sprinkler system for dust control on open lot livestock pens, greater than 60 acres, w/appurtenances and including complete labor and installation | Acre | $6,651.44 | 100 | $665,144.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 2400 | $65,088.00 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #19 - Manure Harvest-More Than Twice per Year and Truck-Mounted Mobile Sprinkler System

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation more than twice per year in addition to a regular annual manure clean-out and use of a mobile truck-mounted sprinkler on a confined animal operation. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and does not supply additional moisture to the pens and working alleys. There is a dry, loose manure layer that is subject to animal activity resulting in emissions of particulate matter that cause nuisance dusting or visibility-impairment effects.

**After Situation:**

In addition to the annual manure clean-out, four additional manure harvesting efforts remove the dry, loose manure layer from the pens and working alleys. Each manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. A mobile truck-mounted sprinkler is used once per day to provide enough water addition to meet the maximum total daily wet soil evaporation rate, with allowances for moisture input to pens/working alleys from animal manure and urine. The application is intended to avoid excessive overlap and over-application of water. Associated practices include 436 - Irrigation Reservoir and 533 - Pumping Plant.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,151.86

**Scenario Cost/Unit:** $4,151.86

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 365 | $2,197.30 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 12 | $679.68 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 12 | $624.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 24 | $650.88 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #20 - Solid-Set Sprinkler System Labor

**Scenario Description:**

Labor for the active management of an installed solid-set sprinkler system for dust control at a confined animal operation to improve the system performance. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

A solid-set dust control sprinkler system is installed. However, the confined animal operation is not actively managing the sprinkler system to optimize performance.

**After Situation:**

In subsequent years following the installation of a solid-set dust control sprinkler system, the confined animal operation provides appropriate labor to actively manage the sprinkler system, thereby improving the reliability and effectiveness of the system.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $80.43

**Scenario Cost/Unit:** $80.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 0.5 | $23.63 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #21 - Manure Harvest-1 per Year and Solid-Set Sprinkler System Labor

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation once per year in addition to a regular annual manure clean-out and labor for the active management of an installed solid-set sprinkler system for dust control at a confined animal operation to improve the system performance. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and a solid-set dust control sprinkler system is installed. However, the confined animal operation is not actively managing the sprinkler system to optimize performance.

**After Situation:**

In addition to the annual manure clean-out, an additional manure harvesting removes the dry, loose manure layer from the pens and working alleys. This manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. In subsequent years following the installation of a solid-set dust control sprinkler system, the confined animal operation provides appropriate labor to actively manage the sprinkler system, thereby improving the reliability and effectiveness of the system.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $569.07

**Scenario Cost/Unit:** $569.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 3 | $169.92 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 3 | $156.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 6 | $162.72 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 0.5 | $23.63 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #22 - Manure Harvest-2 per Year and Solid-Set Sprinkler System Labor

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation twice per year in addition to a regular annual manure clean-out and labor for the active management of an installed solid-set sprinkler system for dust control at a confined animal operation to improve the system performance. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and a solid-set dust control sprinkler system is installed. However, the confined animal operation is not actively managing the sprinkler system to optimize performance.

**After Situation:**

In addition to the annual manure clean-out, two additional manure harvesting efforts remove the dry, loose manure layer from the pens and working alleys. Each manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. In subsequent years following the installation of a solid-set dust control sprinkler system, the confined animal operation provides appropriate labor to actively manage the sprinkler system, thereby improving the reliability and effectiveness of the system.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,057.71

**Scenario Cost/Unit:** $1,057.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 6 | $339.84 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 6 | $312.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 12 | $325.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 0.5 | $23.63 |

**Practice:** 375 - DUST CONTROL FROM ANIMAL ACTIVITY ON OPEN LOT SURFACES

**Scenario** #23 - Manure Harvest-More Than Twice per Year and Solid-Set Sprinkler System Labor

**Scenario Description:**

Combination of removal of loose, dry layer of manure from a confined animal operation more than twice per year in addition to a regular annual manure clean-out and labor for the active management of an installed solid-set sprinkler system for dust control at a confined animal operation to improve the system performance. The specific resource concern to be addressed is "Emissions of Particulate Matter (PM) and PM Precursors".

**Before Situation:**

The confined animal operation conducts a manure clean-out once per year and a solid-set dust control sprinkler system is installed. However, the confined animal operation is not actively managing the sprinkler system to optimize performance.

**After Situation:**

In addition to the annual manure clean-out, four additional manure harvesting efforts remove the dry, loose manure layer from the pens and working alleys. Each manure harvesting will leave a 1-2 inch layer of well-compacted manure above the mineral soil and a smooth pen/alley surface to deter ponding of moisture. In subsequent years following the installation of a solid-set dust control sprinkler system, the confined animal operation provides appropriate labor to actively manage the sprinkler system, thereby improving the reliability and effectiveness of the system.

**Feature Measure:** Pen Surface Area, Including Workin

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,034.99

**Scenario Cost/Unit:** $2,034.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 12 | $679.68 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 12 | $624.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 24 | $650.88 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 0.5 | $23.63 |

**Practice:** 376 - Field Operations Emissions Reduction

**Scenario** #1 - One Crop Per Year

**Scenario Description:**

Utilize equipment that allows a reduction the tillage passes through the field and/or utilizing precision GPS guidance to avoid overlap of tillage passes across the field per crop rotation. Utilize this practice only when residue and STIR values cannot be achieved when using the associated Residue and Tillage Management Practices: 329-No Till or 345-Reduced Tillage to achieve the air quality resource concern. The resource concern addressed is improved air quality by reducing combustion and particulate matter emissions primarily from tillage. The scenario costs are based on tillage equipment or GPS technology to achieve reduce tillage passes.

**Before Situation:**

Tillage operations are performed individually; each operation requiring a tractor or other power implement to pull the tillage implement resulting in multiple passes across the field. Each pass creates soil particulate emissions contributing to the area's reduced air quality.

**After Situation:**

A 376 Field Operations Emissions Reduction plan is developed showing a reduced number of field passes across the field (benchmark system compared to the planned system). As a result of applying this practice soil particulates in the air is reduced and the area's air quality is improved.

**Feature Measure:** Acres Treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $652.00

**Scenario Cost/Unit:** $16.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 40 | $652.00 |

**Practice:** 376 - Field Operations Emissions Reduction

**Scenario** #2 - Two Crops Per Year

**Scenario Description:**

Utilize equipment that allows a reduction of tillage passes through the field and/or precision GPS guidance to avoid overlap of tillage passes across the field per crop rotation. Utilize this practice only when residue and STIR values cannot be achieved when using the associated Residue and Tillage Management Practices: 329-No Till or 345-Reduced Tillage to achieve the air quality resource concern. The resource concern addressed is improved air quality by reducing combustion and particulate matter emissions primarily from tillage. The scenario cost is based on tillage equipment or GPS technology to achieve reduced tillage passes.

**Before Situation:**

Tillage operations are performed individually; each operation requiring a tractor or other power implement to pull the tillage implement resulting in multiple passes across the field. Each pass creates soil particulate emissions contributing to the area's reduced air quality.

**After Situation:**

A 376 Field Operations Emissions Reduction plan is developed showing a reduced number of field passes across the field (benchmark system compared to the planned system). As a result of applying this practice soil particulates in the air is reduced and the area's air quality is improved.

**Feature Measure:** Acres Treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $1,304.00

**Scenario Cost/Unit:** $32.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 80 | $1,304.00 |

**Practice:** 376 - Field Operations Emissions Reduction

**Scenario** #14 - Clean Harvest Technology

**Scenario Description:**

Utilize harvest equipment that is peer reviewed and documented to reduce PM10 by 30% or greater. Technology may also have beneficial impacts to reducing PM2.5 and NOx emissions. Qualified technologies will be approved by the State Air Quality Specialist or equivalent. Typical technologies can include sweepers, harvesters, or other equipment designed to reduce the output of dust, particulates, or other emissions affecting air quality. Equipment could be self-propelled or powered by another unit. Resource Concern addressed is to improve air quality by reducing combustion and particulate matter emissions.

**Before Situation:**

Harvest operations are performed individually; each operation requiring a combustion system and other implement used to harvest crops.

**After Situation:**

The use of clean harvest technology may reduce the total number of passes, reduce the amount of emissions, or meet or prevent a state or local emission regulation. These reductions can come from fossil fuel combustion or particulate matter emissions.

**Feature Measure:** Acres Treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $0.00

**Scenario Cost/Unit:** $0.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Dust Control, Pickup or Haul, Almond Nuts | 2695 | Nut harvesting is a multi-step process. Nuts are shaken from the tree and allowed to dry, then swept into windrows, raked, and finally picked up for transport. This component covers 100 percent of the operation to pick up the nuts, select the percentage of the cost associated with using dust suppression management to decrease the particulate matter generated by at least 30%. | Acre | $0.00 | 40 | $0.00 |

**Practice:** 378 - Pond

**Scenario** #1 - Excavated Pit

**Scenario Description:**

A low-hazard water impoundment structure on agricultural lands to maintain or improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. Pond is created solely by excavation and impounds less than 3 feet against the embankment or spoil. Excavated material is spoiled, not placed in a designed embankment. Earthen spillway is constructed as needed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Vegetation shall be established on all exposed areas, using 342-Critical Area Planting as needed.

**Before Situation:**

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, developing renewable energy systems, other related uses, and to maintain or improve water quality. Failure of the pond will not result in loss of life; damage to homes, commercial or industrial buildings, main highways, or railroads; or in interruption of the use or service of public utilities.

**After Situation:**

The typical pond is constructed by excavating 3100 cubic yards and spreading the spoil outside the pool area using a dozer or similar excavation equipment. Vegetation will be completed under critical area planting (342). Other associated practices include 382-Fence, 516-Pipeline, 521-Pond Sealing and Lining, 533-Pumping Plant, 614-Stock Watering, 587-Structure for Water Control, 396-Aquatic Organism Passage, and 570-Stormwater Runoff Control.

**Feature Measure:** Excavated Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 3,100.0

**Scenario Total Cost:** $14,216.30

**Scenario Cost/Unit:** $4.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 3100 | $7,161.00 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 40 | $4,870.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 42 | $1,686.72 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 378 - Pond

**Scenario** #2 - Embankment Pond without Pipe

**Scenario Description:**

A low-hazard water impoundment structure on agricultural land to maintain or improve water quality or to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. An earthen embankment will be constructed using on site material with an earthen auxiliary spillway. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Vegetation shall be established on all exposed areas, using 342-Critical Area Planting as needed.

**Before Situation:**

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, developing renewable energy systems, other related uses, and to maintain or improve water quality Failure of the embankment will not result in loss of life or damages of any kind.

**After Situation:**

The typical pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 3100 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The earthen auxiliary spillway will be constructed as designed. No principle spillway pipe will be used. Vegetation will be completed under critical area planting (342). Other associated practices include 382-Fence, 516-Pipeline, 521-Pond Sealing and Lining, 533-Pumping Plant, 614-Stock Watering, 587-Structure for Water Control, 396-Aquatic Organism Passage, and 570-Stormwater Runoff Control.

**Feature Measure:** Embankment Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 3,100.0

**Scenario Total Cost:** $28,052.75

**Scenario Cost/Unit:** $9.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 3100 | $7,161.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 3100 | $13,547.00 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 40 | $4,870.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 43 | $1,726.88 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 378 - Pond

**Scenario** #3 - Embankment pond with pipe > 500 yd3

**Scenario Description:**

A low-hazard water impoundment structure on agricultural land to maintain or improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. An earthen embankment will be constructed from on site material with a principle spillway conduit and earthen auxiliary spillway, as designed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Vegetation shall be established on all exposed areas, using 342-Critical Area Planting as needed.

**Before Situation:**

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, developing renewable energy systems, other related uses, and to maintain or improve water quality. Failure of the embankment will not result in loss of life or damages of any kind.

**After Situation:**

The typical low hazard pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 3100 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The principle spillway is installed using an approved conduit material. The earthen auxiliary spillway will be constructed as designed. Vegetation will be completed under critical area planting (342). Other associated practices include 382-Fence, 516-Pipeline, 521-Pond Sealing and Lining, 533-Pumping Plant, 614-Stock Watering, 587-Structure for Water Control, 396-Aquatic Organism Passage, and 570-Stormwater Runoff Control.

**Feature Measure:** Embankment Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 3,100.0

**Scenario Total Cost:** $34,219.58

**Scenario Cost/Unit:** $11.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 3 | $1,310.97 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 3100 | $7,161.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 3100 | $13,547.00 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 48 | $5,844.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 48 | $1,927.68 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 19.6 | $550.96 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 1.6 | $45.58 |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 15 | $473.10 |
| Trash Guard, metal | 1608 | Trash Guard, fabricated-steel, includes materials, equipment, and labor to transport and place Conical shaped trash guard for drop inlet spillway. Typically fabricated of CMP and steel. Includes materials, equipment, and labor to fabricate and transport. | Pound | $2.36 | 118 | $278.48 |
| Pipe, CMP, 30", 16 Gauge | 1742 | 30" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only. | Foot | $28.05 | 8 | $224.40 |
| Pipe, CMP, 18", 16 Gauge | 1743 | 18" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only. | Foot | $17.53 | 98 | $1,717.94 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 378 - Pond

**Scenario** #4 - Embankment Pond without Pipe, Imported Fill

**Scenario Description:**

A low-hazard water impoundment structure on agricultural land to maintain or improve water quality or to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. This scenario applies to sites where imported fill is required for all or part of the embankment. An earthen embankment will be constructed with an earthen auxiliary spillway. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Vegetation shall be established on all exposed areas, using 342-Critical Area Planting as needed.

**Before Situation:**

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control developing renewable energy systems, other related uses, and to maintain or improve water quality Failure of the embankment will not result in loss of life or damages of any kind.

**After Situation:**

The typical pond is constructed by clearing and grubbing the footprint area, preparing foundation material where needed, importing embankment fill free of rock and debris and properly layering and compacting the fill to create the embankments, and constructing the auxiliary spillway. The embankment must meet Low Hazard Class dam criteria. The product of the storage times the effective height of the dam is less than 3,000 acre·ft2. The effective height of the dam is 35 feet or less. The earthen auxiliary spillway will be constructed as designed. No principle spillway pipe is used. Vegetation will be completed under critical area planting (342). Other associated practices include 382-Fence, 516-Pipeline, 521-Pond Sealing and Lining, 533-Pumping Plant, 614-Stock Watering, 587-Structure for Water Control, 396-Aquatic Organism Passage.

**Feature Measure:** Embankment Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 3,100.0

**Scenario Total Cost:** $36,399.50

**Scenario Cost/Unit:** $11.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 3100 | $7,161.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 3100 | $13,547.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 2325 | $8,346.75 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 40 | $4,870.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 43 | $1,726.88 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 378 - Pond

**Scenario** #5 - Difficult Excavation

**Scenario Description:**

A low-hazard water impoundment structure on agricultural lands to maintain or improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. Pond is created solely by excavation. Excavated material is wet and must be spoiled adjacent to the site, then allowed to dry prior to hauling and disposal, it is not placed in a designed embankment. Earthen spillway is constructed as needed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Vegetation shall be established on all exposed areas, using 342-Critical Area Planting as needed.

**Before Situation:**

An area exists where water naturally pools or run off is caught. This creates a sediment laden wet area with debris for livestock, wildlife, fire control, developing renewable energy systems, other related uses, and to maintain or improve water quality. Wet sediment and debris removal from the area will not result in loss of life; damage to homes, commercial or industrial buildings, main highways, or railroads; or in interruption of the use or service of public utilities.

**After Situation:**

Adequate water storage capacity to meet the resource concern is achieved by excavating the wet sediment and debris. The excavated material is wet and must be dried prior to hauling to a permanent fill site. Hauling distance is typically within a mile. After the material is removed, the product of the storage times the effective height of the dam is less than 3,000 acre· ft2. The effective height of the dam is 35 feet or less. Vegetation will be completed under critical area planting (342). Other associated practices include 382-Fence, 521-Pond Sealing and Lining.

**Feature Measure:** Excavated Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,200.0

**Scenario Total Cost:** $14,858.51

**Scenario Cost/Unit:** $12.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 1200 | $4,308.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 40 | $4,466.40 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 24 | $1,248.00 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 1200 | $384.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 64 | $2,570.24 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 24 | $1,134.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 378 - Pond

**Scenario** #6 - Embankment pond with pipe <= 500 yd3

**Scenario Description:**

A low-hazard water impoundment structure to maintain or improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. An earthen embankment will be constructed from on site material with a principle spillway conduit and earthen auxiliary spillway, as designed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Vegetation shall be established on all exposed areas, using 342-Critical Area Planting as needed.

**Before Situation:**

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, developing renewable energy systems, other related uses, and to maintain or improve water quality. Failure of the embankment will not result in loss of life or damages of any kind.

**After Situation:**

The typical low hazard pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and creating an embankment. In all, 500 yd3 or less earthwork is carried out. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The principle spillway is installed using an approved conduit material. The earthen auxiliary spillway will be constructed as designed. Vegetation will be completed under critical area planting (342). Other associated practices include 382-Fence, 516-Pipeline, 521-Pond Sealing and Lining, 533-Pumping Plant, 614-Stock Watering, 587-Structure for Water Control, 396-Aquatic Organism Passage, and 570-Stormwater Runoff Control.

**Feature Measure:** Embankment Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $14,978.35

**Scenario Cost/Unit:** $29.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formless, non reinforced | 36 | Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $138.47 | 7.8 | $1,080.07 |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 1.4 | $393.36 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 500 | $2,185.00 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 16 | $1,948.00 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 4 | $246.36 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4 | $108.48 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 16 | $642.56 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 24 | $1,134.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 62 | $4,267.46 |
| Pipe, CMP, 24", 12 Gauge | 1417 | 24" Corrugated Metal Pipe, Galvanized, Uncoated, 12 gage. Material cost only. | Foot | $28.77 | 60 | $1,726.20 |
| Trash Guard, metal | 1608 | Trash Guard, fabricated-steel, includes materials, equipment, and labor to transport and place Conical shaped trash guard for drop inlet spillway. Typically fabricated of CMP and steel. Includes materials, equipment, and labor to fabricate and transport. | Pound | $2.36 | 118 | $278.48 |
| Pipe, CMP, 36", 12 Gauge | 1825 | 36" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only. | Foot | $42.71 | 11 | $469.81 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 378 - Pond

**Scenario** #7 - Difficult Excavation, embankment pond with pipe

**Scenario Description:**

A low-hazard water impoundment structure to maintain or improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. Wet sediment and debris are excavated and hauled from the pond storage area, and a principle spillway conduit and earthen auxiliary spillway is installed. After the wet material is excavated from the site, it is temporarily stored nearby to dry. Once dried, the material is then loaded and hauled to a permanent fill site within 1 mile of the project site. In addition, an earthen embankment is constructed from on site material with a principle spillway conduit and earthen auxiliary spillway, as designed. The wet material is frequently not used as embankment fill. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Vegetation shall be established on all exposed areas, using 342-Critical Area Planting as needed.

**Before Situation:**

An area exists where water naturally pools or run off is caught. This creates a sediment laden wet area with debris which could be enhanced to provide water for livestock, wildlife, fire control, developing renewable energy systems, other related uses, and to maintain or improve water quality. Wet sediment and debris removal from the area will not result in loss of life; damage to homes, commercial or industrial buildings, main highways, or railroads; or in interruption of the use or service of public utilities. Furthermore, an embankment is constructed. Failure of the embankment will not result in loss of life or damages of any kind.

**After Situation:**

Adequate water storage capacity to meet the resource concern is achieved by excavating the wet sediment and debris. The excavated wet material (1200 cy) is excavated and disposed of at a permanent fill site. Hauling distance is typically within a mile. An embankment (500 cy) and necessary spillway (s) are constructed as designed. For this scenario, 1,700 yd3 is carried out as excavation and earthwork. The product of the storage times the effective height of the dam is less than 3,000 acre· ft2. The effective height of the dam is 35 feet or less. Vegetation will be completed under critical area planting (342). Other associated practices include 382-Fence, 521-Pond Sealing and Lining. Total earthwork is excavation (1,200 cy) + Embankment fill (500 cy) = 1,700 cy

**Feature Measure:** Earthwork

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,700.0

**Scenario Total Cost:** $36,665.48

**Scenario Cost/Unit:** $21.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formless, non reinforced | 36 | Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $138.47 | 7.8 | $1,080.07 |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 1.4 | $393.36 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 500 | $2,185.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 1200 | $4,308.00 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 16 | $1,948.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 40 | $4,466.40 |
| Front End Loader, 95 HP | 1327 | Wheeled front end loader with horsepower range of 80 to 110. Equipment and power unit costs. Labor not included. | Hour | $52.00 | 24 | $1,248.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 80 | $3,212.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 120 | $13,556.40 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 62 | $4,267.46 |

**Practice:** 378 - Pond

**Scenario** #62 - Embankment Pond with Lined Auxiliary Spillway, No Pipe

**Scenario Description:**

A low-hazard water impoundment structure on agricultural land to maintain or improve water quality or to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. An earthen embankment will be constructed using on site material with a lined auxiliary spillway. Although this scenario uses rock as a lining, this scenario also covers any other hard surfacing material suck as concrete. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Vegetation shall be established on all exposed areas, using 342-Critical Area Planting as needed.

**Before Situation:**

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, developing renewable energy systems, other related uses, and to maintain or improve water quality Failure of the embankment will not result in loss of life or damages of any kind.

**After Situation:**

The typical pond is constructed by excavating the pool area, constructing the lined auxiliary spillway, preparing the foundation as designed, and using 2,000 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The lined auxiliary spillway will be constructed as designed. No principle spillway pipe will be used. Vegetation will be completed under critical area planting (342). Other associated practices include 382-Fence, 516-Pipeline, 521-Pond Sealing and Lining, 533-Pumping Plant, 614-Stock Watering, 587-Structure for Water Control, 396-Aquatic Organism Passage, and 570-Stormwater Runoff Control.

**Feature Measure:** Embankment Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $74,549.87

**Scenario Cost/Unit:** $37.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 2000 | $4,620.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 2000 | $8,740.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 889 | $61,189.87 |

**Practice:** 379 - Multi-Story Cropping

**Scenario** #1 - Non-native Tree Planting

**Scenario Description:**

Non-native trees are planted to enhance existing agroforest conditions or develop an agroforest on cropland where shrubs, trees, and/or dwarf trees will grow. Resource concerns are degraded plant condition - Inadequate structure and composition, and excessive plant pest pressure (invasive species); Inadequate habitat for fish and wildlife - habitat degradation; and soil erosion - sheet and rill; .

**Before Situation:**

The agroforest lacks an overstory of trees, and that is negatively affecting existing plants growing on the site. Other non-native shrub species exist and landowner desires to establish a non-native forest overstory improve growing conditions and diversity. Wildlife species are also negatively impacted due to no connectivity to forests. Production and quality of agroforest products are less than desirable. Full sunlight exposure affects shrub health. Ground cover is lacking and sheet and rill erosion occurs during hard rainfall events. Exotic/invasive plants are an issue.

**After Situation:**

The typical Agroforest is <1ac to 5 ac, 2 ac is average. Non-native trees were planted that will grow and provide shade for the existing managed shrubs and/or trees and to create habitat that will benefit terrestrial species. Tree leaves will also provide ground cover, organic matter and wood products.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $1,258.61

**Scenario Cost/Unit:** $6.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 12 | $148.32 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 66 | $30.36 |
| Tree or Shrub, band pots, common species | 1522 | Band pots of common species trees or shrubs (e.g. Crabapple). Includes materials and shipping only. | Each | $2.12 | 67 | $142.04 |
| Tree or shrub seedling, Tropical, non-native, containerized, 10 cu in | 1548 | tree or shrub tropical seedling, non-native, containerized, 10 cubic in size, 1.7" x 6.0" Includes materials and shipping only. | Each | $3.27 | 67 | $219.09 |

**Practice:** 379 - Multi-Story Cropping

**Scenario** #2 - Native Tree Planting

**Scenario Description:**

Native trees are planted to reestablish an open native forest and enhance existing agroforest conditions or develop an agroforest on cropland where shrubs, trees, and/or dwarf trees will grow. Resource concerns are soil erosion - sheet and rill; degraded plant condition - Inadequate structure and composition, and excessive plant pest pressure (invasive species); and Inadequate habitat for fish and wildlife - habitat degradation.

**Before Situation:**

The agroforest lacks an overstory of trees, and that is negatively affecting existing plants growing on the site. Other native or non-native shrub species exist and landowner desires to establish a native forest overstory. Wildlife species are also negatively impacted due to no connectivity to surrounding forests. Production and quality of agroforest products does not meet landowner needs. Full sunlight exposure affects shrub health. Ground cover is lacking and sheet and rill erosion occurs during hard rainfall events. Exotic/invasive plants are an issue.

**After Situation:**

The typical Agroforest is <1ac to 5 ac, 2 is average. Native trees are established that will provide shade for the existing managed shrubs and/or trees, to establish habitat that will benefit terrestrial species and provide connectivity to other native forests. Trees leaves will also provide ground cover, organic matter and wood products. The number of trees and their spacing will be determined by the shade/sun requirements of the existing agroforest species. Each planting spot is cleared of vegetation prior to tree establishment.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $1,586.12

**Scenario Cost/Unit:** $7.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 12 | $148.32 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Tree or shrub seedling, Tropical, native, bare root | 1539 | Tree or shrub, tropical, native, bare root. Includes materials and shipping only. | Each | $3.04 | 100 | $304.00 |
| Tree or shrub seedling, Tropical, native or non-native, 1 qt. | 1541 | Tree or shrub tropical seedling, native or non-native, 1 quart pot size. Includes materials and shipping only. | Each | $4.15 | 100 | $415.00 |

**Practice:** 379 - Multi-Story Cropping

**Scenario** #3 - Native Shrub Planting

**Scenario Description:**

Native shrubs are planted to enhance the current agroforest conditions. The land management goal is to diversify understory species that provide dual benefit - for the landowner and native wildlife species. Resource concerns that need to be addressed are degraded plant condition - Inadequate structure and composition, Undesirable plant productivity and health.

**Before Situation:**

Current setting is a single story forest, either monoculture or multi-culture, that is lacking desirable understory species. The understory may be comprised of introduced grasses, or unwanted, noxious, and/or invasive species. The current understory vegetation provides little habitat value for native wildlife species, and may encourage non-native specie use.

**After Situation:**

The agroforest is small in size - <1 to 5 acres, 2 is average. Established shrubs enhance economic opportunities along with diversifying the understory of a single or multi-story agroforest improving the overall plant diversity of the landscape. Additional canopy cover reduces rain drop impact on the soil, and leaf litter decomposes on site improving soil conditions. Some trees in the overstory may be removed to match sunlight requirements of newly established shrubs.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $1,586.12

**Scenario Cost/Unit:** $7.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 12 | $148.32 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Tree or shrub seedling, Tropical, native, bare root | 1539 | Tree or shrub, tropical, native, bare root. Includes materials and shipping only. | Each | $3.04 | 100 | $304.00 |
| Tree or shrub seedling, Tropical, native or non-native, 1 qt. | 1541 | Tree or shrub tropical seedling, native or non-native, 1 quart pot size. Includes materials and shipping only. | Each | $4.15 | 100 | $415.00 |

**Practice:** 379 - Multi-Story Cropping

**Scenario** #4 - Non-native Shrubs

**Scenario Description:**

The landscape setting is an existing agroforests where native or non-native trees are growing, providing shade, and wildlife habitat connectivity. Ground cover between shrubs trees is lacking. Due to removal of native vegetation exotic/invasive plant species are an issue. Resource concerns that need to be addressed are soil erosion - sheet and rill; degraded plant condition - Inadequate structure and composition, and excessive plant pest pressure (invasive species).

**Before Situation:**

Current setting is a single story forest, either monoculture or multi-culture, that is lacking desirable understory/ground species. The understory may be comprised of introduced grasses, or unwanted, noxious, and/or invasive species. The current understory vegetation provides little habitat value for native wildlife species, and may encourage non-native specie use. As with any shrub establishment preparing the site for the seedling survival is critical. Describe the setting where the practice will be installed.

**After Situation:**

Multistory Cropping is an intensive use of the defined landscape and generally is small in size - <1 to 5 acres, 2 is average. Established shrubs enhance economic opportunities along with diversifying the understory of a single or multi-story agroforest improving the overall diversity of the landscape. Additional canopy cover reduces rain drop impact on the soil, and leaf litter decomposes on site improving soil conditions. Some trees in the overstory may be removed to match sunlight requirements of newly established shrubs.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $1,258.61

**Scenario Cost/Unit:** $6.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 12 | $148.32 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 66 | $30.36 |
| Tree or Shrub, band pots, common species | 1522 | Band pots of common species trees or shrubs (e.g. Crabapple). Includes materials and shipping only. | Each | $2.12 | 67 | $142.04 |
| Tree or shrub seedling, Tropical, non-native, containerized, 10 cu in | 1548 | tree or shrub tropical seedling, non-native, containerized, 10 cubic in size, 1.7" x 6.0" Includes materials and shipping only. | Each | $3.27 | 67 | $219.09 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #1 - 1-row, tree or shrub, bareroot, hand planted

**Scenario Description:**

Single row of shrubs and/or trees, bareroot stock, planted by hand 4-10 feet apart. This practice is typically applied to crop, pasture or range or headquarters. Resource Concerns to be addressed may include: Soil Erosion (wind); Air Quality (odors, chemical drift, etc.); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations); Degraded Plant Condition (undesirable plant productivity and health); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); or Excess/Insufficient Water (drifted snow, inefficient moisture management).

**Before Situation:**

Agricultural field, livestock paddock, feedlot, or farmstead, needing protection from chemical drift, odors, or wind; additional wildlife food and cover, or management of snow deposition

**After Situation:**

Wind velocity or air movement suitably reduced. Additional wildlife food and cover. Typical length is 500'.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $371.62

**Scenario Cost/Unit:** $0.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 3 | $37.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 62 | $28.52 |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.54 | 25 | $13.50 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.53 | 87 | $46.11 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #2 - 1-row, trees, containers, hand planted

**Scenario Description:**

Single row of trees, container stock, planted by hand at 10 foot spacing. This practice is typically applied to crop, pasture or range or headquarters. Resource Concerns to be addressed may include: Soil Erosion (wind); Air Quality (odors, chemical drift, etc.); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations); Degraded Plant Condition (undesirable plant productivity and health); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); or Excess/Insufficient Water (drifted snow, inefficient moisture management).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from chemical drift, odors, wind, additional wildlife food and cover, or management of snow deposition

**After Situation:**

Wind velocity or air movement suitably reduced. Additional wildlife food and cover. Typical length is 500'.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $325.09

**Scenario Cost/Unit:** $0.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 3 | $64.17 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 2 | $24.72 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 3 | $85.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, containerized, 20 cu. in. | 1521 | Containerized conifer stock, 20 cubic inches (e.g. "Styro 45" plug), 2.4" x 6". Includes materials and shipping only. | Each | $1.13 | 50 | $56.50 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #3 - 1-row, trees, containers, hand planted, protected

**Scenario Description:**

Single row of trees, container stock with tree protection, planted by hand at 10 foot spacing. This practice is typically applied to crop, pasture or range or headquarters. Resource Concerns to be addressed may include: Soil Erosion (wind); Air Quality (odors, chemical drift, etc.); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations); Degraded Plant Condition (undesirable plant productivity and health); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); or Excess/Insufficient Water (drifted snow, inefficient moisture management).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from chemical drift, odors, wind, additional wildlife food and cover, or management of snow deposition

**After Situation:**

Wind velocity or air movement suitably reduced. Additional wildlife food and cover. Typical length is 500'.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $484.24

**Scenario Cost/Unit:** $0.97

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 3 | $37.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, containerized, 20 cu. in. | 1521 | Containerized conifer stock, 20 cubic inches (e.g. "Styro 45" plug), 2.4" x 6". Includes materials and shipping only. | Each | $1.13 | 50 | $56.50 |
| Tree shelter, solid tube type, 4" x 18" | 1562 | 4" x 18" tree tube for protection from animal damage. Materials only. | Each | $1.16 | 50 | $58.00 |
| Cable ties, plastic | 1575 | Plastic cable ties (typ. 8-12") to assist in securing items. Materials only. | Each | $0.05 | 50 | $2.50 |
| Stakes, wood, 3/4" x 3/4" x 36" | 1581 | 3/4" x 3/4" x 36" wood stakes to fasten items in place. Includes materials only. | Each | $0.73 | 50 | $36.50 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #4 - 2-row, shrubs, machine planted

**Scenario Description:**

Two rows of shrubs for wind protection, energy conservation, wildlife habitat, air quality, snow management or to provide a visual screen. Shrubs planted with a tree planting machine 4 feet apart in the row with rows 16 feet apart. Typical length is 500 feet. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screen or management of snow deposition

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening. Typical length is 500'.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $332.54

**Scenario Cost/Unit:** $0.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 2 | $48.64 |
| Mechanical tree planter | 1600 | Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor. | Hour | $7.01 | 2 | $14.02 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1 | $28.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 2 | $54.24 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 250 | $115.00 |
| Wire flags | 1586 | Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows | Each | $0.09 | 40 | $3.60 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #5 - 2-row, trees, machine planted

**Scenario Description:**

Two rows of trees for wind protection, energy conservation, wildlife habitat, air quality (odors and/or chemical screens), snow management or to provide a visual screen. Trees planted with a tree planting machine 10 feet apart in the row with rows 16 feet apart. Herbivores (deer, rabbits, etc.) are NOT expected to browse tree seedlings, tree protection is not needed. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screen or management of snow deposition

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual and chemical screening. Typical length is 500'.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $213.09

**Scenario Cost/Unit:** $0.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 1 | $24.32 |
| Mechanical tree planter | 1600 | Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor. | Hour | $7.01 | 1 | $7.01 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1 | $28.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1 | $27.12 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.54 | 100 | $54.00 |
| Wire flags | 1586 | Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows | Each | $0.09 | 40 | $3.60 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #6 - 2-row, trees, machine planted, protected

**Scenario Description:**

Two 500 foot rows of hardwood tree seedlings for wind protection, energy conservation, wildlife habitat, air quality, snow management or to provide a visual screen. Trees planted with a tree planting machine 10 feet apart in the row with rows 16 feet apart. Herbivore (deer, rabbits, etc.) damage is likely, so each tree must be protected with a rigid tube tree shelter. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screen or management of snow deposition

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening. Typical length is 500'.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $695.13

**Scenario Cost/Unit:** $1.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 1 | $24.32 |
| Mechanical tree planter | 1600 | Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor. | Hour | $7.01 | 1 | $7.01 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1 | $27.12 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.54 | 100 | $54.00 |
| Tree shelter, solid tube type, 5" x 48" | 1571 | 5" x 48" tree tube for protection from animal damage. Materials only. | Each | $2.15 | 100 | $215.00 |
| Cable ties, plastic | 1575 | Plastic cable ties (typ. 8-12") to assist in securing items. Materials only. | Each | $0.05 | 200 | $10.00 |
| Stakes, wood, 3/4" x 3/4" x 60" | 1583 | 3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only. | Each | $1.60 | 100 | $160.00 |
| Wire flags | 1586 | Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows | Each | $0.09 | 40 | $3.60 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #7 - 2-row, tree-shrub, hand planted

**Scenario Description:**

Two rows of trees and shrubs planted by hand. Trees are 10 feet apart in the row; shrubs are spaced at 4 feet; Rows are 16 feet apart. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screen or management of snow deposition

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening. Typical length is 500'.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $581.40

**Scenario Cost/Unit:** $1.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 6 | $74.16 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 6 | $170.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 125 | $57.50 |
| Tree, conifer, seedling, containerized, 20 cu. in. | 1521 | Containerized conifer stock, 20 cubic inches (e.g. "Styro 45" plug), 2.4" x 6". Includes materials and shipping only. | Each | $1.13 | 50 | $56.50 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #8 - 2-row, tree-shrub, hand planted, protected

**Scenario Description:**

Two rows of trees and shrubs planted by hand. Trees are 10 feet apart in the row; shrubs are spaced at 4 feet within rows; Rows are 16 feet apart. Herbivore (deer, rabbits, etc.) damage is likely, so each seedling must be protected; trees typically with a rigid tube tree shelter; shrubs with wire mesh, vexar or similar. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screen or management of snow deposition

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening. Typical length is 500'.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $906.35

**Scenario Cost/Unit:** $1.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 6 | $74.16 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 9 | $255.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 125 | $57.50 |
| Tree, conifer, seedling, containerized, 20 cu. in. | 1521 | Containerized conifer stock, 20 cubic inches (e.g. "Styro 45" plug), 2.4" x 6". Includes materials and shipping only. | Each | $1.13 | 50 | $56.50 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.53 | 125 | $66.25 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 50 | $111.50 |
| Cable ties, plastic | 1575 | Plastic cable ties (typ. 8-12") to assist in securing items. Materials only. | Each | $0.05 | 50 | $2.50 |
| Stakes, wood, 3/4" x 3/4" x 48" | 1582 | 3/4" x 3/4" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $1.19 | 50 | $59.50 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #9 - 2-row, tree-shrub, chemical drift, hand planted

**Scenario Description:**

Two rows of trees and shrubs planted by hand for chemical drift reduction. Plants should start relatively large (2 to 3 gallon) to fill in space more quickly to block drift. Trees are planted 10 feet apart in the row; shrubs are planted 4 feet apart in the row. Rows are 10-16 feet apart. This practice is typically applied to prevent chemical drift to adjacent cropland. Resource concerns addressed is primarily Air Quality Impacts for chemical drift. May have additional benefits for Air Quality (odors or particulate matter), Soil Erosion (wind); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

**Before Situation:**

Agricultural field needing protection from chemical drift.

**After Situation:**

Windbreak constructed to maximize interception of chemical drift (usually 40% porosity at maturity). May also have benefits for reducing wind velocity to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening. Typical length is 500'.

**Feature Measure:** Length of windbreak rows

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $3,185.25

**Scenario Cost/Unit:** $6.37

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 4 | $97.28 |
| Trailer, flatbed, small | 1505 | Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $15.61 | 2 | $31.22 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 15 | $185.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 30 | $852.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4 | $108.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted or B&B, 2-3 gal. | 1527 | Potted or balled and burlapped shrub, 2-3 gal. Includes materials and shipping only. | Each | $8.89 | 125 | $1,111.25 |
| Tree, conifer, seedling or transplant, potted or B&B, 2-3 gal. | 1537 | Potted or balled and burlapped conifer tree, 2-3 gal. Includes materials and shipping only. | Each | $6.90 | 50 | $345.00 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #10 - 3-row or more, tree-shrub, hand planted

**Scenario Description:**

Three rows or more of trees and shrubs planted by hand. Trees are 10 feet apart in the row; shrubs are spaced at 4 feet within rows; Rows are 16 feet apart. The outside rows are shrubs/conifers the inside row(s) are hardwoods; follow job sheet for specific site. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screening or management of snow deposition

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening. Typical length is 500'.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $717.04

**Scenario Cost/Unit:** $1.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 7.5 | $92.70 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 7.5 | $213.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 125 | $57.50 |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.54 | 25 | $13.50 |
| Tree, conifer, seedling, containerized, 20 cu. in. | 1521 | Containerized conifer stock, 20 cubic inches (e.g. "Styro 45" plug), 2.4" x 6". Includes materials and shipping only. | Each | $1.13 | 50 | $56.50 |
| Tree, hardwood, seedling or transplant, potted, 1 qt. | 1529 | Potted hardwood tree, 1 quart. Includes materials and shipping only. | Each | $2.44 | 25 | $61.00 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #11 - 3-row or more, tree-shrub, hand planted, protected

**Scenario Description:**

Three rows or more of trees and shrubs planted by hand. Trees are 10 feet apart in the row; shrubs are spaced at 4 feet within rows; Rows are 16 feet apart. The outside rows are shrubs/conifers the inside row(s) are hardwoods; follow job sheet for specific site. Herbivore (deer, rabbits, etc.) damage is likely, so each tree must be protected with a rigid tube tree shelter. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screening or management of snow deposition

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $1,201.29

**Scenario Cost/Unit:** $2.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 7.5 | $92.70 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 125 | $57.50 |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.54 | 25 | $13.50 |
| Tree, conifer, seedling, containerized, 20 cu. in. | 1521 | Containerized conifer stock, 20 cubic inches (e.g. "Styro 45" plug), 2.4" x 6". Includes materials and shipping only. | Each | $1.13 | 50 | $56.50 |
| Tree, hardwood, seedling or transplant, potted, 1 qt. | 1529 | Potted hardwood tree, 1 quart. Includes materials and shipping only. | Each | $2.44 | 25 | $61.00 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.53 | 125 | $66.25 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 100 | $223.00 |
| Cable ties, plastic | 1575 | Plastic cable ties (typ. 8-12") to assist in securing items. Materials only. | Each | $0.05 | 100 | $5.00 |
| Stakes, wood, 3/4" x 3/4" x 48" | 1582 | 3/4" x 3/4" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $1.19 | 100 | $119.00 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #12 - 4-row, Snow Shelter

**Scenario Description:**

Two, double rows of junipers or other suitable conifer seedlings are planted to serve as a snow fence following specific design criteria for unique site requirements. Typically each 2-row set has 16' spacing between rows and 48' between each set; 10ft spacing within rows. Mesh tubing installed for seedling protection when needed. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Excess/Insufficient Water (drifted snow, inefficient moisture management), Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity), and Soil Erosion (wind).

**Before Situation:**

Snow drifts across areas of major use.

**After Situation:**

Windbreak is installed consisting of a two 2-row set of trees to settle snow prior to prevent drifting across roadways. Length of windbreak extends a sufficient length beyond the affected area to avoid end-drift. Typical length is 500'.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $716.25

**Scenario Cost/Unit:** $1.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 5 | $106.95 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 5 | $61.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, containerized, 15 cu. in. | 1520 | Containerized conifer stock, 15 cubic inches (e.g. 2.0" x 6"). Includes materials and shipping only. | Each | $0.58 | 200 | $116.00 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.53 | 100 | $53.00 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #13 - 1-row, Tree and/or Shrub, with Wind-protection Fence

**Scenario Description:**

Single row of trees and/or shrubs, planted by hand 4-10 feet apart with a wind-protection fence (i.e., snow fence, slatted wood fence) sufficient to protect seedlings from wind damage abrasion and from deposition which buries seedlings with wind-blown sand/silt. This practice is typically applied on or adjacent to cropland where wind erosion is excessive. Resource Concerns to be addressed may include: Soil Erosion (wind); Air Quality (odors, chemical drift, etc.); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations); Degraded Plant Condition (undesirable plant productivity and health); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); or Excess/Insufficient Water (drifted snow, inefficient moisture management).

**Before Situation:**

Windblown sand and silt is a problem making it difficult to establish young seedlings. Additionally, one or more of the following resource concerns are identified on the site: sediments are deposited into surface waters; there is lack of wildlife or pollinator habitat; air or soil quality issues are present.

**After Situation:**

Wind velocity or air movement is suitably reduced. New seedlings are protected from wind damage. Typical length is 500'.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $721.00

**Scenario Cost/Unit:** $1.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 4 | $49.44 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, containerized, 20 cu. in. | 1521 | Containerized conifer stock, 20 cubic inches (e.g. "Styro 45" plug), 2.4" x 6". Includes materials and shipping only. | Each | $1.13 | 50 | $56.50 |
| Shrub, seedling or transplant, potted, 1 qt. | 1524 | Potted shrub, 1 quart. Includes materials and shipping only. | Each | $2.49 | 50 | $124.50 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.53 | 50 | $26.50 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #1 - Commercial Thinning & Establish Native Grasses

**Scenario Description:**

Commercial thinning of an existing stand of trees followed by establishment of native grasses.

**Before Situation:**

10-acre pine plantation that is overstocked, with a basal area of 100 sq. ft. per acre. There is very little available forage for livestock, due to the dense shade of the tree canopy. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition, Wildfire Hazard, Excessive Biomass Accumulation; Livestock Production Limitation - Inadequate Feed and Forage, and Inadequate Livestock Shelter.

**After Situation:**

The stand is thinned commercially to a basal area of 50 sqft. per acre, which will allow adequate sunlight to the forest floor for grass production, yet still provide shade and some protection from the elements for livestock and wildlife. Since thinning is done commercially, no harvesting costs are incurred. Debris is removed, all tree cutting will leave the shortest possible stump height. The soil is prepared for planting using chemical and mechanical means, then a mix of native warm-season grasses will be established, providing forage to livestock and wildlife. All Resource Concerns listed above are addressed.

**Feature Measure:** Acres of silvopasture established

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $4,954.50

**Scenario Cost/Unit:** $495.45

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 10 | $109.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 10 | $60.20 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 10 | $65.00 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 10 | $104.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 2 | $41.94 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 10 | $75.60 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 500 | $225.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 500 | $200.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 20 | $777.60 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 10 | $70.70 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 10 | $188.70 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 10 | $2,132.20 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #2 - Commercial Thinning & Establish Introduced Grasses

**Scenario Description:**
Commercial thinning of an existing stand of trees followed by establishment of introduced grasses.

**Before Situation:**
10-acre pine plantation that is overstocked, with a basal area of 100 sq. ft. per acre. There is very little available forage for livestock, due to the dense shade of the tree canopy. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition, Wildfire Hazard, Excessive Biomass Accumulation; Livestock Production Limitation - Inadequate Feed and Forage, and Inadequate Livestock Shelter.

**After Situation:**
The stand is thinned commercially to a basal area of 50 sqft. per acre, which will allow adequate sunlight to the forest floor for grass production, yet still provide shade and some protection from the elements for livestock and wildlife. Since thinning is done commercially, no harvesting costs are incurred. Debris is removed, all tree cutting will leave the shortest possible stump height. The soil is prepared for planting using chemical and mechanical means, then a mix of cool-season grasses and legumes will be established, providing forage to livestock and wildlife. All Resource Concerns listed above are addressed.

**Feature Measure:** Acres of silvopasture established

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,301.30

**Scenario Cost/Unit:** $330.13

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 10 | $109.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 10 | $60.20 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 10 | $65.00 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 10 | $104.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 2 | $41.94 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 10 | $75.60 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 500 | $225.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 500 | $200.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 20 | $777.60 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 10 | $70.70 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 10 | $188.70 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 10 | $479.00 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #3 - Non-Commercial Thinning & Establish Native Grasses

**Scenario Description:**

Non-commercial thinning of an existing stand of trees followed by establishment of native grasses.

**Before Situation:**

10-acre pine plantation that is overstocked, with a basal area of 100 sq. ft. per acre. There is very little available forage for livestock, due to the dense shade of the tree canopy. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition, Wildfire Hazard, Excessive Biomass Accumulation; Livestock Production Limitation - Inadequate Feed and Forage, and Inadequate Livestock Shelter.

**After Situation:**

The stand is thinned non-commercially to a basal area of 50 sqft. per acre, which will allow adequate sunlight to the forest floor for grass production, yet still provide shade and some protection from the elements for livestock and wildlife. Debris is removed, all tree cutting will leave the shortest possible stump height. The soil is prepared for planting using chemical and mechanical means, then a mix of native warm-season grasses will be established, providing forage to livestock and wildlife. All Resource Concerns listed above are addressed.

**Feature Measure:** Acres of silvopasture established

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $6,915.90

**Scenario Cost/Unit:** $691.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 60 | $257.40 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 10 | $109.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 10 | $60.20 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 10 | $65.00 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 10 | $104.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 2 | $41.94 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 10 | $75.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 60 | $1,704.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 500 | $225.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 500 | $200.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 20 | $777.60 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 10 | $70.70 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 10 | $188.70 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 10 | $2,132.20 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #4 - Non-Commercial Thinning & Establish Introduced Grasses

**Scenario Description:**

Non-commercial thinning of an existing stand of trees followed by establishment of introduced grasses.

**Before Situation:**

10-acre pine plantation that is overstocked, with a basal area of 100 sq. ft. per acre. There is very little available forage for livestock, due to the dense shade of the tree canopy. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition, Wildfire Hazard, Excessive Biomass Accumulation; Livestock Production Limitation - Inadequate Feed and Forage, and Inadequate Livestock Shelter.

**After Situation:**

The stand is thinned non-commercially to a basal area of 50 sqft. per acre, which will allow adequate sunlight to the forest floor for grass production, yet still provide shade and some protection from the elements for livestock and wildlife. Debris is removed, all tree cutting will leave the shortest possible stump height. The soil is prepared for planting using chemical and mechanical means, then a mix of cool-season grasses and legumes will be established, providing forage to livestock and wildlife. All Resource Concerns listed above are addressed.

**Feature Measure:** Acres of silvopasture established

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,451.40

**Scenario Cost/Unit:** $545.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 60 | $257.40 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 10 | $109.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 10 | $60.20 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 10 | $65.00 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 10 | $104.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 2 | $41.94 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 10 | $75.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 60 | $1,704.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 500 | $225.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 500 | $200.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 20 | $777.60 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 10 | $70.70 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 10 | $188.70 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 10 | $188.70 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 10 | $479.00 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #5 - Existing Trees, Establish Native Grasses

**Scenario Description:**

Establishment of native grasses into an existing stand of trees that is already at an adequate density .

**Before Situation:**

10-acre pine plantation woodlot that has a basal area of 50 sq. ft. per acre. There is very little available forage for livestock, due to undesirable species in the understory. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition; Livestock Production Limitation - Inadequate Feed and Forage.

**After Situation:**

The soil is prepared for planting using chemical and mechanical means, then a mix of native warm-season grasses will be established, providing forage to livestock and wildlife. All Resource Concerns listed above are addressed.

**Feature Measure:** Acres of silvopasture established

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,980.04

**Scenario Cost/Unit:** $398.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 10 | $109.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 10 | $60.20 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 10 | $65.00 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 10 | $104.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 2 | $41.94 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 10 | $75.60 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 500 | $225.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 500 | $200.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 20 | $777.60 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 10 | $188.70 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 10 | $2,132.20 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #6 - Existing Trees, Establish Introduced Grasses

**Scenario Description:**

Establishment of introduced grasses into an existing stand of trees that is already at an adequate density .

**Before Situation:**

10-acre pine plantation woodlot that has a basal area of 50 sq. ft. per acre. There is very little available forage for livestock, due to undesirable species in the understory. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition; Livestock Production Limitation - Inadequate Feed and Forage.

**After Situation:**

The soil is prepared for planting using chemical and mechanical means, then a mix of cool-season grasses and legumes will be established, providing forage to livestock and wildlife. All Resource Concerns listed above are addressed.

**Feature Measure:** Acres of silvopasture established

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,326.84

**Scenario Cost/Unit:** $232.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 10 | $109.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 10 | $60.20 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 10 | $65.00 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 10 | $104.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 2 | $41.94 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 10 | $75.60 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 500 | $225.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 500 | $200.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 20 | $777.60 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 10 | $188.70 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 10 | $479.00 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #7 - Establish Trees & Native Grasses

**Scenario Description:**

Establishment of trees and native grasses into a field that contains neither suitable forage nor suitable tree cover for a silvopasture system.

**Before Situation:**

10-acre old field without suitable forage for livestock nor tree cover. There is very little available forage for livestock, due to undesirable species in the understory. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition; Livestock Production Limitation - Inadequate Feed and Forage, and Inadequate Livestock Shelter.

**After Situation:**

The site will be prepared using chemical and mechanical means, a mix of native warm-season grasses will be established, and then 200 pine trees per acre will be planted, providing forage to livestock and wildlife, and, in time, producing a viable wood products crop. Per the conservation practice standard, livestock grazing will be deferred until the trees reach adequate height to resist damage, or use exclusion measures are established. All Resource Concerns listed above are addressed.

**Feature Measure:** Acres of silvopasture established

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,365.36

**Scenario Cost/Unit:** $536.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 10 | $109.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 10 | $60.20 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 10 | $65.00 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 10 | $104.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 2 | $41.94 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 4 | $97.28 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 10 | $75.60 |
| Mechanical tree planter | 1600 | Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor. | Hour | $7.01 | 4 | $28.04 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 500 | $225.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 500 | $200.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 20 | $777.60 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 10 | $188.70 |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.54 | 2000 | $1,080.00 |
| Wire flags | 1586 | Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows | Each | $0.09 | 2000 | $180.00 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 10 | $2,132.20 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #8 - Establish Trees & Introduced Grasses

**Scenario Description:**

Establishment of trees and introduced grasses and legumes into a field that contains neither suitable forage nor suitable tree cover for a silvopasture system.

**Before Situation:**

10-acre old field without suitable forage for livestock nor tree cover. There is very little available forage for livestock, due to undesirable species in the understory. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition; Livestock Production Limitation - Inadequate Feed and Forage, and Inadequate Livestock Shelter.

**After Situation:**

The site will be prepared using chemical and mechanical means, a mix of cool-season grasses and legumes will be established, and then 200 pine trees per acre will be planted, providing forage to livestock and wildlife, and, in time, producing a viable wood products crop. Per the conservation practice standard, livestock grazing will be deferred until the trees reach adequate height to resist damage, or use exclusion measures are established. All Resource Concerns listed above are addressed.

**Feature Measure:** Acres of silvopasture established

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,552.16

**Scenario Cost/Unit:** $355.22

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 10 | $109.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 10 | $60.20 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 10 | $65.00 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 10 | $104.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 2 | $41.94 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 4 | $97.28 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 10 | $75.60 |
| Mechanical tree planter | 1600 | Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor. | Hour | $7.01 | 4 | $28.04 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 500 | $225.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 500 | $200.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 20 | $777.60 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 10 | $188.70 |
| Tree, conifer, seedling, bare root, 1-1 | 1513 | Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only. | Each | $0.46 | 2000 | $920.00 |
| Wire flags | 1586 | Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows | Each | $0.09 | 2000 | $180.00 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 10 | $479.00 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #9 - Establish Trees, Existing Grasses

**Scenario Description:**

Establishment of trees into an existing pasture that contains adequate native or introduced forage.

**Before Situation:**

10-acre pasture with suitable forage for livestock. There is very little protection from the elements (sun, wind, etc.) available to the livestock. Additionally, there are no long-term wood products being produced. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition, Livestock Production Limitation - Inadequate Livestock Shelter.

**After Situation:**

The site will be prepared using Tree/Shrub Site Preparation (490), if needed, and then 200 pine trees per acre will be planted, providing shade and wind protection to livestock and wildlife, and, in time, producing a viable wood products crop. Per the conservation practice standard, livestock grazing will be deferred until the trees reach adequate height to resist damage, or use exclusion measures are established. All Resource Concerns listed above are addressed.

**Feature Measure:** Acres of silvopasture established

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,290.32

**Scenario Cost/Unit:** $129.03

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 10 | $65.00 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 4 | $97.28 |
| Mechanical tree planter | 1600 | Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor. | Hour | $7.01 | 4 | $28.04 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, bare root, 1-1 | 1513 | Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only. | Each | $0.46 | 2000 | $920.00 |
| Wire flags | 1586 | Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows | Each | $0.09 | 2000 | $180.00 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 382 - Fence

**Scenario** #1 - Barbed/Smooth Wire

**Scenario Description:**

Multi-strand, Barbed or Smooth Wire or woven - Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality and/or reduction of noxious and invasive weeds.

**Before Situation:**

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies or woody buffers is uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds and/or exclusion from woody buffers. Fence includes posts, wire, fasteners, gates, etc... Four strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,640.0

**Scenario Total Cost:** $12,444.86

**Scenario Cost/Unit:** $4.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 24 | $172.32 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 160 | $3,422.40 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 24 | $583.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 160 | $4,544.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 24 | $650.88 |
| **Materials** | | | | | | |
| Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll | 1 | Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only. | Each | $72.51 | 8 | $580.08 |
| Post, Wood, CCA treated, 3-4" x 7' | 9 | Wood Post, Line 3-4" X 7', CCA Treated. Includes materials and shipping only. | Each | $6.38 | 40 | $255.20 |
| Post, Wood, CCA treated, 4" x 8' | 10 | Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only. | Each | $8.21 | 4 | $32.84 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.38 | 8 | $123.04 |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.81 | 165 | $1,123.65 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 2640 | $448.80 |
| Gate, Pipe, 14' | 1058 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $170.15 | 2 | $340.30 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 382 - Fence

**Scenario** #2 - Difficult Installation

**Scenario Description:**

Installation of Multi-strand, Barbed or Smooth Wire fence in difficult situations will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive areas, improved water quality and/or reduction of noxious and invasive weeds.

**Before Situation:**

On grazing lands plant health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds. Fence installation conditions are for difficult sites such as poor access, steep slopes, rocky sites, dense brush, wet conditions etc.

**After Situation:**

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, brace posts, etc... Fence will be installed with wildlife friendly considerations.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,640.0

**Scenario Total Cost:** $17,643.00

**Scenario Cost/Unit:** $6.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 40 | $287.20 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 8 | $34.32 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 250 | $5,347.50 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 40 | $972.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 250 | $7,100.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 40 | $1,084.80 |
| **Materials** | | | | | | |
| Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll | 1 | Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only. | Each | $72.51 | 8 | $580.08 |
| Post, Wood, CCA treated, 4" x 8' | 10 | Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only. | Each | $8.21 | 4 | $32.84 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.38 | 8 | $123.04 |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.81 | 165 | $1,123.65 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 2640 | $448.80 |
| Gate, Pipe, 14' | 1058 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $170.15 | 2 | $340.30 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 382 - Fence

**Scenario** #3 - Woven Wire

**Scenario Description:**

Woven - Installation of fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive areas, improved water quality and/or reduction of noxious and invasive weeds. Land is typically rolling to steep.

**Before Situation:**

On grazing lands plant health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, livestock access to water bodies is uncontrolled. Reduced vegetative cover increases opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

Installation of fence will allow for implementation of a rotational grazing plan that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Woven wire fence includes posts, wire, fasteners, gates, etc...

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,640.0

**Scenario Total Cost:** $15,907.42

**Scenario Cost/Unit:** $6.03

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 24 | $172.32 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 200 | $4,278.00 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 24 | $583.68 |
| Fence, Wire Assembly, Woven Wire, Game Fence | 1088 | Brace pins, twist sticks, staples. Includes materials and shipping only. | Foot | $0.25 | 2640 | $660.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 200 | $5,680.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 24 | $650.88 |
| **Materials** | | | | | | |
| Wire, Woven, Galvanized, 12.5 Gauge, 48" | 4 | Galvanized 12.5 gauge, 48" - 330' roll. Includes materials and shipping only. | Each | $261.88 | 8 | $2,095.04 |
| Post, Wood, CCA treated, 4" x 8' | 10 | Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only. | Each | $8.21 | 4 | $32.84 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.38 | 8 | $123.04 |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.81 | 165 | $1,123.65 |
| Gate, Pipe, 14' | 1058 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $170.15 | 2 | $340.30 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 382 - Fence

**Scenario** #4 - Electric

**Scenario Description:**

Electric - Installation of fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive areas, improved water quality and/or reduction of noxious and invasive weeds.

**Before Situation:**

On grazing lands plant health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, fence charger, etc... Two to three strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,640.0

**Scenario Total Cost:** $7,020.83

**Scenario Cost/Unit:** $2.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 16 | $114.88 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 90 | $1,925.10 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 16 | $389.12 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 90 | $2,556.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| **Materials** | | | | | | |
| Wire, High Tensile, 12.5 Gauge, 4,000' roll | 2 | High Tensile 12.5 gauge, 4,000' roll. Includes materials and shipping only. | Each | $116.19 | 2 | $232.38 |
| Post, Wood, CCA treated, 4" x 8' | 10 | Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only. | Each | $8.21 | 4 | $32.84 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.38 | 8 | $123.04 |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.81 | 40 | $272.40 |
| Electric, Ground Rods | 20 | Electric, Ground Rod for electric fence. Includes materials and shipping only. | Each | $10.70 | 3 | $32.10 |
| Electric, Ground Rod Clamps | 21 | Electric, Ground Rod Clamps for electric fence. Includes materials and shipping only. | Each | $1.84 | 3 | $5.52 |
| Electric, Lightening Diverter | 22 | Electric, Lightening diverter for electric fence. Includes materials and shipping only. | Each | $10.46 | 1 | $10.46 |
| Electric, Tester | 26 | Electric, Tester for electric fence. Includes materials and shipping only. | Each | $41.90 | 1 | $41.90 |
| Fence, Wire Assembly, High Tensile, Electric, 3 Strand | 34 | Brace pins, springs, strainers, battens, clips, crimp sleeves, staples, insulators, wrap around sleeves. Includes materials and shipping only. | Foot | $0.13 | 2640 | $343.20 |
| Gate, Pipe, 14' | 1058 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $170.15 | 2 | $340.30 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 382 - Fence

**Scenario** #5 - Safety or Heavy Use

**Scenario Description:**

A barrier fence installed to exclude access in situations where there is a hazard in the exclusion area or where heavy livestock pressure on the fence is expected. Permanently installed fence built to (1) keep humans away from waste storage structures, or (2) to protect sensitive areas (such as riparian areas, wetlands, springs, etc.) where heavy livestock pressure on the fence can be expected. Heavy grade fence materials and close post spacing required.

**Before Situation:**

Where a NRCS designed and constructed waste storage structure is planned whereby significant risk to human safety is determined to be evident. Livestock has access to sensitive areas that may cause detrimental effect to animal/human health and wildlife habitat. Resource concerns affected are plant health and vigor, wildlife habitat, compaction of soils, runoff of sediment or water quality due to turbidity..

**After Situation:**

1. Humans and livestock are excluded from the waste storage structure for safety purposes by installing a fence around a waste storage structure. The fence would typically be about 450' long with 4 gates and installed by a fencing contractor. Woven wire fence with one strand of barb wire on top with gates for manure equipment access. 2. A more strongly built fence is needed because of heavy livestock pressure on the fence due to exclusion from sensitive areas or confinement in a heavy use area in order to achieve exclusion during critical periods. Improved livestock control and access to water or other sensitive areas will promote safety for livestock/humans improve health, vigor of sensitive species, limiting soil erosion, and condition.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 450.0

**Scenario Total Cost:** $3,188.30

**Scenario Cost/Unit:** $7.09

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 8 | $57.44 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 16 | $342.24 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 8 | $194.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| **Materials** | | | | | | |
| Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll | 1 | Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only. | Each | $72.51 | 1 | $72.51 |
| Wire, Woven, Galvanized, 12.5 Gauge, 32" | 3 | Galvanized 12.5 gauge, 32" - 330' roll. Includes materials and shipping only. | Each | $179.23 | 2 | $358.46 |
| Post, Wood, CCA treated, 3-4" x 7' | 9 | Wood Post, Line 3-4" X 7', CCA Treated. Includes materials and shipping only. | Each | $6.38 | 40 | $255.20 |
| Post, Wood, CCA treated, 4" x 8' | 10 | Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only. | Each | $8.21 | 8 | $65.68 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.38 | 16 | $246.08 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 450 | $76.50 |
| Gate, Pipe, 14' | 1058 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $170.15 | 4 | $680.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 382 - Fence

**Scenario** #6 - Wildlife Exclusion

**Scenario Description:**

Installation of fence reduces resource concerns associated with livestock feeding operations and/or wildlife access to prevent conflicts between humans and livestock or wildlife species.

**Before Situation:**

Wildlife negatively impacting sensitive areas such as riparian areas, windbreaks and shelterbelts or feed storage. Disease transmission from wildlife posses a significant health risk to domestic animals.

**After Situation:**

Installation of fence reduces resource concerns associated with livestock and/or wildlife access and prevents conflicts between humans and threatened, endangered or sensitive species. Fence includes posts, wire, fasteners, gates, etc...

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,320.0

**Scenario Total Cost:** $14,264.40

**Scenario Cost/Unit:** $10.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 24 | $172.32 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 200 | $4,278.00 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 24 | $583.68 |
| Fence, Wire Assembly, Woven Wire, Game Fence | 1088 | Brace pins, twist sticks, staples. Includes materials and shipping only. | Foot | $0.25 | 1320 | $330.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 200 | $5,680.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 24 | $650.88 |
| **Materials** | | | | | | |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.38 | 8 | $123.04 |
| Post, Wood, CCA treated, 6" x 12-14' | 13 | Wood Post, Line/End 6" X 12-14', CCA Treated. Includes materials and shipping only. | Each | $27.48 | 16 | $439.68 |
| Post, Steel T, 1.33 lbs, 10' | 17 | Steel Post, Studded 10' - 1.33 lb. Includes materials and shipping only. | Each | $11.13 | 130 | $1,446.90 |
| Gate, Game, 8' High X 14' | 1085 | 14' Wide Game Gate (8' Tall). Includes materials and shipping only. | Each | $392.23 | 1 | $392.23 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 382 - Fence

**Scenario** #7 - Water Quality

**Scenario Description:**

Winter feeding or confinement area is moved at least 1/4-mile away from stream / riparian area. This scenario used 14-gauge commercial pipe panels, but producer may use rough cut lumber, cables or other method that meet the fencing standard (382) for corral-type fencing. The purpose is to improve water quality and riparian function. Size used for pricing was 50 feet by 104 feet or about 5,000 square feet, or about 300 linear feet of fencing.

**Before Situation:**

Winter feeding or confinement area has been located on or adjacent to a stream / riparian area. As a result, water quality and riparian area have been degraded.

**After Situation:**

Moving confinement area away from stream/riparian area will allow for implementation of practices to restore riparian function and water quality.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 308.0

**Scenario Total Cost:** $7,534.25

**Scenario Cost/Unit:** $24.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 8 | $57.44 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 8 | $194.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 64 | $1,817.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| **Materials** | | | | | | |
| Gate, Pipe, 14' | 1058 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $170.15 | 2 | $340.30 |
| Post, Metal steel 4" x 10' | 2562 | Post, Metal steel 4" x 10', painted. Includes materials and shipping only. | Each | $48.77 | 24 | $1,170.48 |
| Post, Wood, CCA treated, 8" x 10' | 2563 | Wood Post, End 8" X 10', CCA Treated. Includes materials and shipping only. | Each | $51.90 | 6 | $311.40 |
| Panel, Corral | 2579 | 14 gauge, 6 metal rail 5' 3" x 10 ', includes materials and shipping only. | Each | $110.24 | 28 | $3,086.72 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 382 - Fence

**Scenario** #8 - Organic Fence

**Scenario Description:**

Multi-strand, Barbed or Smooth Wire with untreated posts - Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality and/or reduction of noxious and invasive weeds. The scenario uses untreated posts and other fence materials accepted for organic certification.

**Before Situation:**

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies or woody buffers is uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds and/or exclusion from woody buffers. Fence includes posts, wire, fasteners, gates, etc... Four strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

**Feature Measure:** Length of fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,640.0

**Scenario Total Cost:** $13,462.74

**Scenario Cost/Unit:** $5.10

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 24 | $172.32 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 160 | $3,422.40 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 24 | $583.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 160 | $4,544.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 24 | $650.88 |
| **Materials** | | | | | | |
| Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll | 1 | Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only. | Each | $72.51 | 8 | $580.08 |
| Post, Wood, CCA treated, 6" x 12-14' | 13 | Wood Post, Line/End 6" X 12-14', CCA Treated. Includes materials and shipping only. | Each | $27.48 | 52 | $1,428.96 |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.81 | 165 | $1,123.65 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 2640 | $448.80 |
| Gate, Pipe, 14' | 1058 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $170.15 | 2 | $340.30 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 383 - Fuel Break

**Scenario** #1 - Dozer, Level to Moderate Slopes

**Scenario Description:**

Fuel Break installation on level to moderate slopes (typically 30% or less) requires tree thinning, treating woody residue, pruning, and mowing. Thinning treatment and pruning is done by hand. Treating woody residue (piling/burning, crushing, mowing, or off-site removal) is mostly mechanized using equipment such as brush hogs, mowers, and dozers. Chemical spot treatment is applied as needed to control sprouting. Resource concerns are degraded plant condition - wildfire hazard, excess biomass accumulation & undesirable productivity and health.

**Before Situation:**

Forest stand is overstocked with desirable and undesirable trees. Overstocking creates conditions conducive to wildfire movement across the landscape, and severe loss/damage of the forest stand. Shrub levels are high and significantly increase wildfire risk. Tree crowns are touching, trees retain limbs down to understory vegetation creating a "ladder" for fire movement into the overstory, and understory vegetation (brush and grasses) create a significant fuel load to rate a high to severe fire hazard. The terrain is level to moderately sloped (0-30%), increasing difficulty as slope steepens.

**After Situation:**

Fuel Break is installed at the property line or a key locations to reduce crown fire spread. Size of fuel break is 4 acres; the width varies due to site conditions. The trees are thinned so open gaps are created in crown overstory, branches on remaining trees are pruned to 8 to 10 feet in height, all woody residue (thinned trees and pruned branches) are treated (piled/burned or lopped/scattered) so little remains in the fuel break and understory vegetation is mowed down to less than 1 foot in height. Cut stumps have been chemically treated to control sprouting.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $7,572.62

**Scenario Cost/Unit:** $1,893.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 10 | $1,217.50 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 80 | $343.20 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 8 | $407.68 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 8 | $509.68 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 8 | $40.56 |
| Pruning tool, pole saw | 1319 | Gasoline powered pole chainsaw. Labor not included. | Hour | $8.54 | 8 | $68.32 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 88 | $2,499.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 20 | $542.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 12 | $481.92 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 12 | $567.00 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 4 | $28.28 |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $44.20 | 4 | $176.80 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 100 | $102.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 383 - Fuel Break

**Scenario** #3 - Masticator, Level to Moderate Slopes

**Scenario Description:**

Fuel Break installation on level to moderate slopes (typically 30% or less) requires tree thinning, treating woody residue, pruning, and mowing. Thinning treatment and pruning is done by hand. Woody residue (thinned trees, pruned branches and brush) is mostly masticated but some is piled/burned, hauled of site or lopped/scattered. Cut stumps are chemically treated to control sprouting. Resource concerns are degraded plant condition - wildfire hazard, excess biomass accumulation & undesirable productivity and health.

**Before Situation:**

The forest stand is overstocked with trees (desirable and undesirable) and is at risk of loss if a wildfire should occur. Tree crowns are touching, trees retain limbs down to understory vegetation creating a "ladder" for fire movement into the overstory, and understory vegetation (brush and grasses) create a significant fuel load to rate a high to severe fire hazard. Slope of terrain increases fire hazard. The terrain moderately sloped, 1-30+% increasing difficulty as slope steepens.

**After Situation:**

Fuel Break is installed at the property line or key locations to reduce crown fire spread. Size of fuel break is 4 acres; the width varies due to site conditions. The trees are thinned so open gaps are created in crown overstory, branches on remaining trees are pruned to 8 to 10 feet in height, all woody residue (thinned trees, pruned branches and brush) are mostly masticated but some is piled/burned, hauled of site or lopped/scattered) understory vegetation is cut down to less than 1 foot in height. Cut stumps have been chemically treated to control sprouting.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $7,419.80

**Scenario Cost/Unit:** $1,854.95

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 60 | $257.40 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 5 | $254.80 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 16 | $1,385.28 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 8 | $509.68 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 8 | $40.56 |
| Pruning tool, pole saw | 1319 | Gasoline powered pole chainsaw. Labor not included. | Hour | $8.54 | 8 | $68.32 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 84 | $2,385.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 25 | $678.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 20 | $945.00 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 4 | $28.28 |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $44.20 | 4 | $176.80 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 100 | $102.00 |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 383 - Fuel Break

**Scenario** #5 - Hand Treatments

**Scenario Description:**

Fuel Break installation requires tree thinning, treating woody residue, pruning, and mowing. Thinning treatment, pruning, brush cutting and treating woody residue (piling/burning, crushing, or off-site removal), is done by hand. Resource concerns are degraded plant condition - wildfire hazard, excess biomass accumulation & undesirable productivity and health.

**Before Situation:**

Forest stand is overstocked with desirable and undesirable trees. Overstocking creates conditions conducive to wildfire movement across the landscape, and loss of the forest stand. Excess stocking is impacting the health of the desired forest ecosystem and wildfire hazard poses risk to humans, structures, air quality, plants and animals. Tree crowns are touching, trees retain limbs down to understory vegetation creating a "ladder" for fire movement into the overstory, and understory vegetation (brush and grasses) create a significant fuel load.

**After Situation:**

A fuel break is installed by hand cutting trees, hand pruning remaining trees, piling and burning or removal of woody residue from tree cutting and pruning. Fuel break installation is at property lines, around structures, at roadways, or other key locations to reduce continuity of vegetation cover. Width of fuel break varies based on site conditions.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $9,455.96

**Scenario Cost/Unit:** $2,363.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 240 | $1,029.60 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 12 | $256.68 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 10 | $50.70 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 258 | $7,327.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 14 | $661.50 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 4 | $28.28 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 100 | $102.00 |

**Practice:** 383 - Fuel Break

**Scenario** #6 - Non Forest Lands

**Scenario Description:**

A non forest fuel break occurs outside of forestlands where brush, grass and forbs dominate. Landuses where this scenario will be applied may be range, pasture or wetlands. The fuel break area is mowed/bushhog so standing vegetation is reduced to a low height. Resource concerns are degraded plant condition - wildfire hazard.

**Before Situation:**

Wildfire movement is a concern within the designated area. Vegetation is tall, dense and continuous creating conditions conducive for fire movement across the landscape.

**After Situation:**

A fuel break is installed by shredding/mowing/bushhogging a defined width at property lines, around structures, at roadways, or other key locations to reduce continuity of vegetation cover. Width of fuel break varies based on site conditions.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $1,525.96

**Scenario Cost/Unit:** $381.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 8 | $407.68 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 8 | $161.28 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 6 | $170.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 10 | $271.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #1 - Orchard/Vineyard/Christmas Tree Removal

**Scenario Description:**

Slash created from Orchard/Vineyard/Christmas Tree removal is chipped and removed from the site in order to accomplish one or more purposes: reducing insect/disease substrate; improving access; and/or reducing potential risk to livestock and humans. Air emission reductions are achieved by chipping or shredding the materials in lieu of burning them. Material may be incorporated in the soil, used as a dust suppressant on unpaved roads or traffic areas. Resource concerns include emissions of particulate matter.

**Before Situation:**

Wood waste is either burned, creating an air quality issue, or left in place creating a wildfire hazard, an impediment to access, or a potential site for harboring pests. Energy conservation was not implemented.

**After Situation:**

Treatment of pruning residue results in the reduction in air pollutants, energy conservation occurred, improvement in access, and the reduction of sites that can harbor pests.

**Feature Measure:** Acres of orchard/vineyard with slas

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $6,704.80

**Scenario Cost/Unit:** $335.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 20 | $1,731.60 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 20 | $486.40 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $119.42 | 20 | $2,388.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 62 | $1,681.44 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #2 - Chipping and hauling off-site

**Scenario Description:**

Reducing woody waste created during range, forestry, and agroforestry activities by gathering, chipping, and hauling off site to achieve management objectives. Does not include transport from property to a commercial facility. Resource concerns include potential emissions of particulate matter, potential excessive plant pest pressure, wildfire hazard from excessive biomass accumulation, and habitat degradation

**Before Situation:**

Woody residues, including juniper, causes management issues for wildlife habitat, fire hazard and sites for harboring pests.

**After Situation:**

Wildlife habitat is restored for Sage Grouse or other species. Fire and pest issues are reduced. Planting sites for reforestation are created. Air and energy resources are conserved.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $6,509.86

**Scenario Cost/Unit:** $325.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 20 | $85.80 |
| Brush Chipper, 6" capacity | 938 | Brush Chipper, 6" capacity, typically 35 HP. Includes chipper and power unit. Labor not included. | Hour | $20.86 | 20 | $417.20 |
| Log skidder | 942 | Equipment and power unit costs. Labor not included. | Hour | $125.18 | 10 | $1,251.80 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $56.50 | 20 | $1,130.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 42 | $1,192.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 42 | $1,139.04 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 12 | $481.92 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #3 - Lop and Scatter

**Scenario Description:**

Treating a stand where small diameter trees were thinned by hand, typically 4 to 6 inches in diameter or less. Heights are generally 30 feet or less. Slash accumulation poses wildfire, pest, or disease risk to the stand. Treatment involves lopping limbs and stems to within 18 inches of the ground with a chainsaw. Slopes are gentle to moderate. Lopping and scattering often occurs simultaneously with thinning.

**Before Situation:**

Small diameter woody debris of light to medium densities pose wildfire, pest or disease risks to the stand. Movement through the unit is difficult. Woody debris from thinning or pruning is at unacceptable heights and will persist if left untreated.

**After Situation:**

Chainsaw crews reduce lengths and heights of debris to acceptable levels according to quality criteria. Fuel continuities are reduced. Brood material for pests and pathogens are minimized through accelerated drying and decomposition.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $4,181.40

**Scenario Cost/Unit:** $104.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 100 | $429.00 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 40 | $855.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 102 | $2,896.80 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #4 - Slash Treatment, Light

**Scenario Description:**

Treating an area of forest slash to reduce hazardous fuels and the risk of insect and disease, improve organic matter and reduce erosion while improving water quality. Slash is treated both by hand (cutting, lopping, piling, etc.) and mechanically (masticating, chipping, etc.). Resource concerns include: Wildfire hazard from excessive biomass accumulation and potential Excessive plant pest pressure.

**Before Situation:**

Woody material resulting from a silvicultural practice such as pruning or a light thinning operation is causing both fire hazard and pest issues.

**After Situation:**

Fire and pest issues are reduced with slash spread out and in contact with the ground. Additional benefits include reduced soil movement. The soil is protected and/or enhanced.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $8,379.13

**Scenario Cost/Unit:** $209.48

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 80 | $343.20 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 40 | $855.60 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 40 | $3,463.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 82 | $2,328.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 42 | $1,139.04 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #5 - Forest Slash Treatment, Heavy

**Scenario Description:**

Treating an area of trees and significant woody vegetation to reduce hazardous fuels and the risk of insect and disease, improve organic matter, decrease unwanted biomass, and reduce erosion while improving water quality. Slash is to be lopped/treated/crushed within a foot of the ground, piled, or moved off-site to meet state fire hazard reduction standards. Typical equipment used include masticators, mulchers, drum choppers, and chainsaw work as needed in order to treat this heavier than normal slash load on varying slopes, terrain, accessibility and vegetative density. Resource concerns include potential emission of particulate matter, wildfire hazard from excessive biomass accumulation, excessive plant pest pressure, and habitat degradation.

**Before Situation:**

Heavy woody material (difficult to walk through) resulting from silvicultural/management operations caused both fire hazard, access, potential harm to humans and animals, and pest issues.

**After Situation:**

Fire, access, and pest issues are reduced with slash spread out and in contact with the ground. An additional benefit is reduced soil movement.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $15,161.90

**Scenario Cost/Unit:** $379.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 80 | $343.20 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 40 | $855.60 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 60 | $5,194.80 |
| Heavy mechanical site prep, drum chopping | 1316 | Mechanical operations that pushing trees and vegetation and crushing them with a water filled roller chopper. Requires heavy equipment such as dozers. Includes equipment, power unit and labor costs. | Acre | $156.73 | 20 | $3,134.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 90 | $2,556.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 60 | $1,627.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #6 - Restoration/conservation treatment following catastrophic events

**Scenario Description:**

The use of a combination of hand (chainsaw) and heavy equipment similar to those used in logging to treat slash resulting from catastrophic events such as fire, wind, severe pest outbreak, ice storm, etc. This scenario will remove/treat the larger material the size of which is consistent with the large equipment used. Resource concerns include: Excessive plant pest pressure, Potential emissions of particulate matter, Wildfire hazard from excessive biomass accumulation, and Habitat degradation.

**Before Situation:**

A large amount of slash and woody residue is created as a result of a non-silvicultural event such as a wind storm, wildfire, ice storm, pest outbreak, etc. Because the slash and residue is created by a catastrophic event that can cause tree-lodging, snags, broken tops, etc.; treatment is both difficult and dangerous. The presence of this material causes adverse effects on the forest include limiting access for management purposes, increasing the wildfire hazard, increasing the risk of potential harm to humans and livestock, and providing harboring sites for pests.

**After Situation:**

The material resulting from the catastrophic event is reduced to a level that will minimize the resource concerns.

**Feature Measure:** Acres of affected forest

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $18,850.94

**Scenario Cost/Unit:** $942.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Track Loader, 95HP | 935 | Equipment and power unit costs. Labor not included. | Hour | $86.55 | 40 | $3,462.00 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 80 | $343.20 |
| Log skidder | 942 | Equipment and power unit costs. Labor not included. | Hour | $125.18 | 40 | $5,007.20 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $56.50 | 40 | $2,260.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 90 | $2,556.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 90 | $2,440.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 45 | $1,807.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #21 - Orchard Removal Slash Treatment, Large

**Scenario Description:**

After large orchard trees are pushed over, the slash created during large tree orchard removal is chipped or shredded in lieu of burning. Material may be removed from the site, incorporated in the soil, used as a dust suppressant on unpaved roads or traffic areas. Resource concerns include emissions of particulate matter (PM10).

**Before Situation:**

Wood waste is either burned, creating an air quality issue, or left in place creating a wildfire hazard, an impediment to access, or a potential site for harboring pests. Energy conservation was not implemented.

**After Situation:**

Treatment of woody residue without burning results in the reduction of air pollutants.

**Feature Measure:** Acres of orchard slash treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $20,040.96

**Scenario Cost/Unit:** $1,002.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 20 | $2,233.20 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $119.42 | 20 | $2,388.40 |
| Tub Grinder, 1050 HP | 1402 | TUB grinder-1050 HP, 15' tub opening, 11'2" diameter inside base. Includes equipment cost only. Labor not included. | Hour | $375.58 | 20 | $7,511.60 |
| Front End Loader, 185 HP | 1619 | Wheeled front end loader with horsepower range of 160 to 210. Equipment and power unit costs. Labor not included. | Hour | $91.96 | 20 | $1,839.20 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 80 | $3,212.80 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 6 | $2,855.76 |

**Practice:** 386 - Field Border

**Scenario** #5 - Field Border, Native Species

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of organic seed for herbaceous species.

**Before Situation:**

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

**After Situation:**

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices while creating a buffer between organic systems and conventional cropping systems. Native grasses and legumes will be established in the field border to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall be adapted to the site, not function as a host for diseases of a field crop, and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $122.23

**Scenario Cost/Unit:** $122.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 3 | $32.82 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Materials** | | | | | | |
| Untreated Conventional Seed, One Species, Warm Season, Native Perennial Grass | 2341 | Untreated conventional native, warm season perennial grass. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $68.44 | 1 | $68.44 |

**Practice:** 386 - Field Border

**Scenario** #6 - Field Border, Introduced Species

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of introduced species.

**Before Situation:**

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

**After Situation:**

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Introduced grasses and legumes will be established in the field border to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall be adapted to site, will not function as a host for diseases of a field crop, and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $86.88

**Scenario Cost/Unit:** $86.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.48 | 30 | $14.40 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 20 | $9.00 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.57 | 1 | $31.57 |

**Practice:** 386 - Field Border

**Scenario** #7 - Field Border, Pollinator

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of pollinator friendly species.

**Before Situation:**

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

**After Situation:**

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Pollinator herbaceous plantings will provide species which flower throughout the growing season. This provides a source of nectar for adult pollinators and a diversity of herbaceous material for immature pollinator life stages and for nesting. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall be adapted to site, will not function as a host for diseases of a field crop, and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,005.80

**Scenario Cost/Unit:** $1,005.80

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 3 | $32.82 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Materials** | | | | | | |
| Six Species Mix, Native Forb | 2334 | Native forb mix. Includes material and shipping only. | Acre | $952.01 | 1 | $952.01 |

**Practice:** 388 - Irrigation Field Ditch

**Scenario** #1 - Irrigation Field Ditch

**Scenario Description:**

This scenario is the construction of an Irrigation Field Ditch. Typical construction dimensions are 2' wide bottom x 2' deep x 1320' length with a side slope of 2:1. Resource concerns: Excess/Insufficient Water - Inefficient Use of Irrigation Water Associated Conservation Practices: 320-Irrigation Canal or Lateral; 443-Irrigation System, Surface or Subsurface Water; 533-Pumping Plant; 430-Irrigation Pipeline.

**Before Situation:**

Water supply for an area is inadequate for crop production and irrigation water application is inefficient.

**After Situation:**

An earthen canal that has adequate capacity to convey sufficient irrigation water to meet the demands of the system and make irrigation practical for the crops being grown.

**Feature Measure:** Volume of earth excavated

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 587.0

**Scenario Total Cost:** $1,691.31

**Scenario Cost/Unit:** $2.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 587 | $1,355.97 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #1 - Riparian Broadcast Seeding

**Scenario Description:**

Use in habitats subject to intermittent flooding and saturated soils where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide adequate habitat. Site adapted species of grasses, legumes, and/or forbs are planted by broadcast and/or no-till or range drill seeding methods as necessary to accomplish the intended purpose(s). Seedbed preparation may require LIGHT TILLAGE (disking). Practice applies in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. Practices that may facilitate the establishment of riparian herbaceous cover may include: Herbaceous Weed Control (315), Range Planting (550), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Early Successional Habitat Dev. and Mgmt (647), Streambank and Shoreline Protection ( 580), Stream Habitat Improvement and Management (395), Access Control (472), Prescribed Grazing (528). Resource Concerns include: Inadequate Habitat for Fish and Wildlife, Degraded Plant Condition, Soil Erosion, Water Quality Degradation.

**Before Situation:**

The riparian zone vegetation is currently an undesirable or inadequate stand of perennial or annual vegetation as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 for those elements. Natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time. Existing vegetation does not provide adequate food, cover, and/or connectivity for riparian wildlife, and contributes insufficient amounts of organic matter for stream species food and cover. Riparian vegetation quality and/or quantity have been compromised by human activities and/or access of vehicles, people, and/or livestock to the extent that the riparian area and floodplain are not functioning to provide the necessary stream and riparian habitat components.

**After Situation:**

The riparian zone is established to an adapted, diverse vegetative plant community and is under close management to ensure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

**Feature Measure:** Acres of Riparian Herbaceous Cove

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,392.07

**Scenario Cost/Unit:** $1,392.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 3 | $32.82 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 1 | $12.37 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Six Species Mix, Native Forb | 2334 | Native forb mix. Includes material and shipping only. | Acre | $952.01 | 1 | $952.01 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #2 - Plug Planting

**Scenario Description:**

The riparian area is usually a narrow strip between the aquatic and terrestrial habitats subject to intermittent flooding and saturated soils where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide adequate habitat. Site adapted species of grasses, legumes, and/or forbs are planted as plugs to improve success. Seedbed preparation may require LIGHT TILLAGE (disking). Practice applies in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. Typically applied to 0.5 acres of herbaceous cover. Practices that may facilitate the establishment of riparian herbaceous cover may include: Herbaceous Weed Control (315), Range Planting (550), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Early Successional Habitat Dev. and Mgmt (647), Streambank and Shoreline Protection ( 580), Stream Habitat Improvement and Management (395), Access Control (472), Prescribed Grazing (528). Resource Concerns include: Inadequate Habitat for Fish and Wildlife, Degraded Plant Condition, Soil Erosion, Water Quality Degradation.

**Before Situation:**

The riparian zone vegetation is currently an undesirable or inadequate stand of perennial or annual vegetation as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 for those elements. Natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time. Existing vegetation does not provide adequate food, cover, and/or connectivity for riparian wildlife, and contributes insufficient amounts of organic matter for stream species food and cover. Riparian vegetation quality and/or quantity have been compromised by human activities and/or access of vehicles, people, and/or livestock to the extent that the riparian area and floodplain are not functioning to provide the necessary stream and riparian habitat components.

**After Situation:**

The riparian zone is established to an adapted, diverse vegetative plant community and is under close management to ensure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

**Feature Measure:** Acres of Riparian Herbaceous Cove

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $13,276.37

**Scenario Cost/Unit:** #Div/0!

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 0.5 | $10.49 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 5 | $142.00 |
| **Materials** | | | | | | |
| Native Aquatic Plants, Emergent or Submerged | 2336 | Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping. | Each | $1.32 | 9680 | $12,777.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #3 - Combination Broadcast Seeding and Plug Planting

**Scenario Description:**

The riparian area is usually a narrow strip between the aquatic and terrestrial habitats subject to intermittent flooding and saturated soils where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide adequate habitat. Site adapted species of grasses, legumes, and/or forbs are planted by both broadcast and/or no-till or range drill seeding methods AND as plugs to ensure better species success. Seedbed preparation may require LIGHT TILLAGE (disking). Practice applies in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. Practices that may facilitate the establishment of riparian herbaceous cover may include: Herbaceous Weed Control (315), Range Planting (550), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Early Successional Habitat Dev. and Mgmt (647), Streambank and Shoreline Protection ( 580), Stream Habitat Improvement and Management (395), Access Control (472), Prescribed Grazing (528). Resource Concerns include: Inadequate Habitat for Fish and Wildlife, Degraded Plant Condition, Soil Erosion, Water Quality Degradation.

**Before Situation:**

The riparian zone vegetation is currently an undesirable or inadequate stand of perennial or annual vegetation as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 for those elements. Natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time. Existing vegetation does not provide adequate food, cover, and/or connectivity for riparian wildlife, and contributes insufficient amounts of organic matter for stream species food and cover. Riparian vegetation quality and/or quantity have been compromised by human activities and/or access of vehicles, people, and/or livestock to the extent that the riparian area and floodplain are not functioning to provide the necessary stream and riparian habitat components.

**After Situation:**

The riparian zone is established to an adapted, diverse vegetative plant community and is under close management to ensure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

**Feature Measure:** Acres of Riparian Herbaceous Cove

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $13,457.58

**Scenario Cost/Unit:** $13,457.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.5 | $6.19 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 0.5 | $10.49 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| One Species, Native Forb, Low Cost | 2329 | Native forb. Includes material and shipping only. | Acre | $179.65 | 0.5 | $89.83 |
| Native Aquatic Plants, Emergent or Submerged | 2336 | Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping. | Each | $1.32 | 9680 | $12,777.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #4 - Pollinator Cover

**Scenario Description:**

A riparian area where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide adequate habitat. To improve habitat for pollinators, include 2-12 species that bloom sequentially during the growing season and ensure at least 2 species in bloom at any given time during the growing season. Site adapted species of grasses, legumes, and/or forbs are planted by both broadcast and/or no-till or range drill seeding methods and/or as plugs to ensure better species success. Seedbed preparation may require LIGHT TILLAGE (disking). Practice applies in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. Practices that may facilitate the establishment of riparian herbaceous cover may include: Herbaceous Weed Control (315), Range Planting (550), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Early Successional Habitat Dev. and Mgmt (647), Streambank and Shoreline Protection ( 580), Stream Habitat Improvement and Management (395), Access Control (472), Prescribed Grazing (528). Resource Concerns include: Inadequate Habitat for Fish and Wildlife, Degraded Plant Condition, Soil Erosion, Water Quality Degradation.

**Before Situation:**

The riparian zone vegetation is currently an undesirable or inadequate stand of perennial or annual vegetation as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 for those elements. Natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time. Existing vegetation does not provide adequate food, cover, and/or connectivity for riparian wildlife, and contributes insufficient amounts of organic matter for stream species food and cover, and is undesirable to pollinators. Riparian vegetation quality and/or quantity have been compromised by human activities and/or access of vehicles, people, and/or livestock to the extent that the riparian area and floodplain are not functioning to provide the necessary stream and riparian habitat components.

**After Situation:**

The riparian zone is established to an adapted, diverse vegetative plant community and is under close management to ensure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $1,312.17

**Scenario Cost/Unit:** #Div/0!

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 0.5 | $10.49 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 5 | $142.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 2 | $54.24 |
| **Materials** | | | | | | |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $566.31 | 0.5 | $283.16 |
| Six Species Mix, Native Forb | 2334 | Native forb mix. Includes material and shipping only. | Acre | $952.01 | 0.5 | $476.01 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #5 - Broadcast Seeding with Foregone Income

**Scenario Description:**

Use in habitats subject to intermittent flooding and saturated soils where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide adequate habitat. Area is removed from agricultural production. Site adapted species of grasses, legumes, and/or forbs are planted by broadcast and/or no-till or range drill seeding methods as necessary to accomplish the intended purpose(s). Seedbed preparation may require LIGHT TILLAGE (disking). Practice applies in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. Practices that may facilitate the establishment of riparian herbaceous cover may include: Herbaceous Weed Control (315), Range Planting (550), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Early Successional Habitat Dev. and Mgmt (647), Streambank and Shoreline Protection ( 580), Stream Habitat Improvement and Management (395), Access Control (472), Prescribed Grazing (528). Resource Concerns include: Inadequate Habitat for Fish and Wildlife, Degraded Plant Condition, Soil Erosion, Water Quality Degradation.

**Before Situation:**

The riparian zone vegetation is currently an undesirable or inadequate stand of perennial or annual vegetation as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 for those elements. Natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time. Existing vegetation does not provide adequate food, cover, and/or connectivity for riparian wildlife, and contributes insufficient amounts of organic matter for stream species food and cover. Riparian vegetation quality and/or quantity have been compromised by human activities and/or access of vehicles, people, and/or livestock to the extent that the riparian area and floodplain are not functioning to provide the necessary stream and riparian habitat components.

**After Situation:**

The riparian zone is established to an adapted, diverse vegetative plant community and is under close management to ensure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

**Feature Measure:** Acres of Riparian Herbaceous Cove

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $1,099.28

**Scenario Cost/Unit:** #Div/0!

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1.5 | $16.41 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.5 | $6.19 |
| **Foregone Income** | | | | | | |
| FI, Corn Irrigated | 1960 | Irrigated Corn is Primary Crop | Acre | $473.54 | 0.5 | $236.77 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 5 | $142.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 2 | $54.24 |
| **Materials** | | | | | | |
| Six Species Mix, Native Forb | 2334 | Native forb mix. Includes material and shipping only. | Acre | $952.01 | 0.5 | $476.01 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #6 - Plug Planting with Foregone income

**Scenario Description:**

Use in habitats subject to intermittent flooding and saturated soils where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide adequate habitat. Area is removed from agricultural production. Site adapted species of grasses, legumes, and/or forbs are planted as plugs to improve success. Seedbed preparation may require LIGHT TILLAGE (disking). Practice applies in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. Practices that may facilitate the establishment of riparian herbaceous cover may include: Herbaceous Weed Control (315), Range Planting (550), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Early Successional Habitat Dev. and Mgmt (647), Streambank and Shoreline Protection ( 580), Stream Habitat Improvement and Management (395), Access Control (472), Prescribed Grazing (528). Resource Concerns include: Inadequate Habitat for Fish and Wildlife, Degraded Plant Condition, Soil Erosion, Water Quality Degradation.

**Before Situation:**

The riparian zone vegetation is currently an undesirable or inadequate stand of perennial or annual vegetation as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 for those elements. Natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time. Existing vegetation does not provide adequate food, cover, and/or connectivity for riparian wildlife, and contributes insufficient amounts of organic matter for stream species food and cover. Riparian vegetation quality and/or quantity have been compromised by human activities and/or access of vehicles, people, and/or livestock to the extent that the riparian area and floodplain are not functioning to provide the necessary stream and riparian habitat components.

**After Situation:**

The riparian zone is established to an adapted, diverse vegetative plant community and is under close management to ensure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

**Feature Measure:** Acres of Riparian Herbaceous Cove

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $13,513.14

**Scenario Cost/Unit:** #Div/0!

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 0.5 | $10.49 |
| **Foregone Income** | | | | | | |
| FI, Corn Irrigated | 1960 | Irrigated Corn is Primary Crop | Acre | $473.54 | 0.5 | $236.77 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 5 | $142.00 |
| **Materials** | | | | | | |
| Native Aquatic Plants, Emergent or Submerged | 2336 | Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping. | Each | $1.32 | 9680 | $12,777.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #7 - Combination Broadcast Seeding and Plug Planting with Foregone Income

**Scenario Description:**

Use in habitats subject to intermittent flooding and saturated soils where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide adequate habitat. Area is removed from agricultural production. Site adapted species of grasses, legumes, and/or forbs are planted by both broadcast and/or no-till or range drill seeding methods AND as plugs to ensure better species success. Seedbed preparation may require LIGHT TILLAGE (disking). Practice applies in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. Practices that may facilitate the establishment of riparian herbaceous cover may include: Herbaceous Weed Control (315), Range Planting (550), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Early Successional Habitat Dev. and Mgmt (647), Streambank and Shoreline Protection ( 580), Stream Habitat Improvement and Management (395), Access Control (472), Prescribed Grazing (528). Resource Concerns include: Inadequate Habitat for Fish and Wildlife, Degraded Plant Condition, Soil Erosion, Water Quality Degradation.

**Before Situation:**

The riparian zone vegetation is currently an undesirable or inadequate stand of perennial or annual vegetation as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 for those elements. Natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time. Existing vegetation does not provide adequate food, cover, and/or connectivity for riparian wildlife, and contributes insufficient amounts of organic matter for stream species food and cover. Riparian vegetation quality and/or quantity have been compromised by human activities and/or access of vehicles, people, and/or livestock to the extent that the riparian area and floodplain are not functioning to provide the necessary stream and riparian habitat components.

**After Situation:**

The riparian zone is established to an adapted, diverse vegetative plant community and is under close management to ensure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

**Feature Measure:** Acres of Riparian Herbaceous Cove

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $7,160.35

**Scenario Cost/Unit:** #Div/0!

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 0.5 | $5.47 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.25 | $3.09 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 0.25 | $5.24 |
| **Foregone Income** | | | | | | |
| FI, Corn Irrigated | 1960 | Irrigated Corn is Primary Crop | Acre | $473.54 | 0.5 | $236.77 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1 | $27.12 |
| **Materials** | | | | | | |
| One Species, Native Forb, Low Cost | 2329 | Native forb. Includes material and shipping only. | Acre | $179.65 | 0.25 | $44.91 |
| Native Aquatic Plants, Emergent or Submerged | 2336 | Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping. | Each | $1.32 | 4840 | $6,388.80 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #8 - Pollinator Cover with Foregone Income

**Scenario Description:**

A riparian area where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide adequate habitat. Area is removed from agricultural production. To improve habitat for pollinators, include 2-12 species that bloom sequentially during the growing season and ensure at least 2 species in bloom at any given time during the growing season. Site adapted species of grasses, legumes, and/or forbs are planted by both broadcast and/or no-till or range drill seeding methods and/or as plugs to ensure better species success. Seedbed preparation may require LIGHT TILLAGE (disking). Practice applies in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. Practices that may facilitate the establishment of riparian herbaceous cover may include: Herbaceous Weed Control (315), Range Planting (550), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Early Successional Habitat Dev. and Mgmt (647), Streambank and Shoreline Protection ( 580), Stream Habitat Improvement and Management (395), Access Control (472), Prescribed Grazing (528). Resource Concerns include: Inadequate Habitat for Fish and Wildlife, Degraded Plant Condition, Soil Erosion, Water Quality Degradation.

**Before Situation:**

The riparian zone vegetation is currently an undesirable or inadequate stand of perennial or annual vegetation as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 for those elements. Natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time. Existing vegetation does not provide adequate food, cover, and/or connectivity for riparian wildlife, and contributes insufficient amounts of organic matter for stream species food and cover, and is undesirable to pollinators. Riparian vegetation quality and/or quantity have been compromised by human activities and/or access of vehicles, people, and/or livestock to the extent that the riparian area and floodplain are not functioning to provide the necessary stream and riparian habitat components.

**After Situation:**

The riparian zone is established to an adapted, diverse vegetative plant community and is under close management to ensure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $1,520.54

**Scenario Cost/Unit:** #Div/0!

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 0.5 | $10.49 |
| **Foregone Income** | | | | | | |
| FI, Corn Irrigated | 1960 | Irrigated Corn is Primary Crop | Acre | $473.54 | 0.5 | $236.77 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 2 | $54.24 |
| **Materials** | | | | | | |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $566.31 | 0.5 | $283.16 |
| Six Species Mix, Native Forb | 2334 | Native forb mix. Includes material and shipping only. | Acre | $952.01 | 0.5 | $476.01 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #1 - Seeding

**Scenario Description:**

Establish a buffer of trees and/or shrubs to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of trees or shrubs planted through direct seeding. Planting rate will be approximately 3000 seed per acre. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,138.85

**Scenario Cost/Unit:** $213.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 8 | $194.56 |
| Mechanical nut planter | 1601 | Mechanical nut planter for direct seeding of trees and shrubs. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor. | Hour | $2.07 | 8 | $16.56 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 12 | $325.44 |
| **Materials** | | | | | | |
| Trees and shrubs, seed | 1871 | Tree or shrub seed, e.g., acorns, to establish trees. Includes materials and shipping only. | Pound | $4.51 | 300 | $1,353.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #2 - Cuttings, Small to Medium

**Scenario Description:**

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of tree and/or shrub live stakes (whips) planted by hand. The cuttings will be planted in a mosaic pattern while still dormant. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,862.34

**Scenario Cost/Unit:** $1,862.34

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 4 | $49.44 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 680 | $326.40 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #3 - Cuttings, Medium to Large

**Scenario Description:**

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of tree and/or shrub poles and live stakes (whips) planted by hand. The ratio of whips to poles will be 5:1. The cuttings will be planted in a mosaic pattern while still dormant. Tree mesh will be placed on the large cuttings. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,828.11

**Scenario Cost/Unit:** $4,828.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 3.5 | $215.57 |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 4.5 | $32.31 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 12 | $256.68 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 4 | $111.04 |
| Tractor, agricultural, 30 HP | 1501 | Agricultural tractor with horsepower range of less than 50. Equipment and power unit costs. Labor not included. | Hour | $9.16 | 4.5 | $41.22 |
| Trailer, flatbed, small | 1505 | Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $15.61 | 8 | $124.88 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 4 | $49.44 |
| Water tank, portable | 1602 | Portable water tank transported in a pick up truck. Typically with 200 gallon capacity includes tank with pump, hose and sprayer. Does not include the pickup truck. Equipment only. | Hour | $2.38 | 3.5 | $8.33 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 10 | $1,129.70 |
| **Materials** | | | | | | |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 250 | $120.00 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.74 | 50 | $887.00 |
| Tree shelter, mesh tree tube, 48" | 1556 | 48" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $1.11 | 50 | $55.50 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 4 | $670.68 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #4 - Bare-root, hand planted

**Scenario Description:**

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of hand planted bare-root shrubs, evergreen, and deciduous trees. One third of the area will be planted to each woody plant type. Planting for shrubs will be done at 6' x 6' spacing, evergreen tree spacing will be 12' x 15' and deciduous tree spacing at 15' x 15'. Tree shelters will be placed on the hardwoods and evergreens. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation. Associated Practices may include Site Preparation or Mulching.

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $4,927.80

**Scenario Cost/Unit:** $1,642.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.30 | 8 | $58.40 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 32 | $395.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 50 | $1,420.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 1210 | $677.60 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 194 | $161.02 |
| Tree, conifer, seedling, bare root, 1-1 | 1513 | Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only. | Each | $0.46 | 242 | $111.32 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 436 | $972.28 |
| Stakes, wood, 1" x 1" x 36" | 1577 | 1" x 1" x 36" wood stakes to fasten items in place. Includes materials only. | Each | $0.61 | 436 | $265.96 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #6 - Small container, hand planted

**Scenario Description:**

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of hand planted small containerized shrubs, evergreen, and deciduous trees. One third of the area will be planted to each woody plant type. Planting for shrubs will be done at 8' x 8' spacing, evergreen tree spacing will be 12' x 15' and deciduous tree spacing at 15' x 15'. Tree shelters will be placed on the hardwoods and evergreens. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $7,680.69

**Scenario Cost/Unit:** $2,560.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 16 | $342.24 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.30 | 8 | $58.40 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 30 | $370.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 50 | $1,420.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1 qt. | 1524 | Potted shrub, 1 quart. Includes materials and shipping only. | Each | $2.49 | 680 | $1,693.20 |
| Tree, hardwood, seedling or transplant, potted, 1 qt. | 1529 | Potted hardwood tree, 1 quart. Includes materials and shipping only. | Each | $2.44 | 194 | $473.36 |
| Tree, conifer, seedling or transplant, potted, 1 qt. | 1534 | Potted conifer tree, 1 quart. Includes materials and shipping only. | Each | $2.42 | 242 | $585.64 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 436 | $972.28 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.07 | 436 | $902.52 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #7 - Small container, machine planted

**Scenario Description:**

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of machine planted small containerized shrubs, evergreen, and deciduous trees. One third of the area will be planted to each woody plant type. Planting for shrubs will be done at 8' x 8' spacing, evergreen tree spacing will be 12' x 15' and deciduous tree spacing at 15' x 15'. Tree shelters will be placed on the hardwoods and evergreens. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $6,573.06

**Scenario Cost/Unit:** $2,191.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 6 | $145.92 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| Mechanical tree planter | 1600 | Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor. | Hour | $7.01 | 6 | $42.06 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 18 | $511.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1 qt. | 1524 | Potted shrub, 1 quart. Includes materials and shipping only. | Each | $2.49 | 680 | $1,693.20 |
| Tree, hardwood, seedling or transplant, potted, 1 qt. | 1529 | Potted hardwood tree, 1 quart. Includes materials and shipping only. | Each | $2.44 | 194 | $473.36 |
| Tree, conifer, seedling or transplant, potted, 1 qt. | 1534 | Potted conifer tree, 1 quart. Includes materials and shipping only. | Each | $2.42 | 242 | $585.64 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 436 | $972.28 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.07 | 436 | $902.52 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #8 - Large container, hand planted

**Scenario Description:**

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of hand planted large containerized shrubs, evergreen, and deciduous trees. One half of the area will be planted to each tree type, hardwoods and conifers, at a spacing of 24' x 24'. Planting for shrubs will be done at 12' x 12' spacing in between the trees. Tree shelters will be placed on the hardwoods and conifers. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation. Associated practices may include Site Preparation, Mulching, Irrigation, and Conservation Cover as needed.

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $19,567.78

**Scenario Cost/Unit:** $6,522.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 16 | $700.48 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 32 | $684.48 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 16 | $444.16 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.30 | 16 | $116.80 |
| Trailer, flatbed, small | 1505 | Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $15.61 | 16 | $249.76 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 90 | $1,112.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 194 | $5,509.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 20 | $542.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 20 | $945.00 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted or B&B, 2-3 gal. | 1527 | Potted or balled and burlapped shrub, 2-3 gal. Includes materials and shipping only. | Each | $8.89 | 680 | $6,045.20 |
| Tree, hardwood, seedling or transplant, potted or B&B, 2-3 gal. | 1532 | Potted or balled and burlapped hardwood tree, 2-3 gal. Includes materials and shipping only. | Each | $7.08 | 112 | $792.96 |
| Tree, conifer, seedling or transplant, potted or B&B, 2-3 gal. | 1537 | Potted or balled and burlapped conifer tree, 2-3 gal. Includes materials and shipping only. | Each | $6.90 | 113 | $779.70 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.22 | 225 | $949.50 |
| Stakes, wood, 3/4" x 3/4" x 60" | 1583 | 3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only. | Each | $1.60 | 225 | $360.00 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #23 - Cuttings, Small to Medium, with FI

**Scenario Description:**

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. Land is converted from crop or forage production to install this buffer. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of tree and/or shrub live stakes (whips) planted by hand. The cuttings will be planted in a mosaic pattern while still dormant. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns. Grazing by livestock or harvesting of crops does not occur within this buffer.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,159.33

**Scenario Cost/Unit:** $2,159.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 4 | $49.44 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.5 | $197.08 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.5 | $99.91 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 680 | $326.40 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #24 - Small container, hand planted, with FI

**Scenario Description:**

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. Land is converted from crop or forage production to install this buffer. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of hand planted small containerized shrubs, evergreen, and deciduous trees. One third of the area will be planted to each woody plant type. Planting for shrubs will be done at 8' x 8' spacing, evergreen tree spacing will be 12' x 15' and deciduous tree spacing at 15' x 15'. Tree shelters will be placed on the hardwoods and evergreens. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns. Grazing by livestock or harvesting of crops does not occur within this buffer.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $8,361.15

**Scenario Cost/Unit:** $2,787.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 16 | $342.24 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.30 | 8 | $58.40 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 30 | $370.80 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 1 | $394.16 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 1 | $199.82 |
| FI, Hay, General Grass | 2122 | General Grass Hay is Primary Land Use | Ton | $43.24 | 2 | $86.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 50 | $1,420.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1 qt. | 1524 | Potted shrub, 1 quart. Includes materials and shipping only. | Each | $2.49 | 680 | $1,693.20 |
| Tree, hardwood, seedling or transplant, potted, 1 qt. | 1529 | Potted hardwood tree, 1 quart. Includes materials and shipping only. | Each | $2.44 | 194 | $473.36 |
| Tree, conifer, seedling or transplant, potted, 1 qt. | 1534 | Potted conifer tree, 1 quart. Includes materials and shipping only. | Each | $2.42 | 242 | $585.64 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 436 | $972.28 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.07 | 436 | $902.52 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 393 - Filter Strip

**Scenario** #5 - Filter Strip, Native species

**Scenario Description:**

A strip or area of herbaceous vegetation that removes contaminants from overland flow. Practice includes seedbed prep and planting of native species.

**Before Situation:**

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring nonagricultural properties. Water Quality resource concerns are associated with this practice.

**After Situation:**

The 393 Implementation Requirements are developed for the site and applied. The planned filter strip will be established and maintained per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and seed. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $163.87

**Scenario Cost/Unit:** $163.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 3 | $32.82 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 1.5 | $41.64 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $68.44 | 1 | $68.44 |

**Practice:** 393 - Filter Strip

**Scenario** #6 - Filter Strip, Introduced species

**Scenario Description:**

A strip or area of herbaceous vegetation that removes contaminants from overland flow. Practice includes seedbed prep and planting of introduced species.

**Before Situation:**

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring nonagricultural properties. Water Quality resource concerns are associated with this practice.

**After Situation:**

The 393 Implementation Requirements are developed for the site and applied. The planned filter strip will be established and maintained per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and seed. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $173.23

**Scenario Cost/Unit:** $173.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 3 | $32.82 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 1 | $6.50 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 1.5 | $41.64 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.48 | 30 | $14.40 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 20 | $9.00 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 1 | $47.90 |

**Practice:** 394 - Firebreak

**Scenario** #1 - Constructed, Light Equipment

**Scenario Description:**

Installation of a bare-ground firebreak of a minimum width of 15' around a 20 acre field/farm using farm equipment (2 passes). Generally water control devices such as water bars are not needed due either to the lack of steep terrain or the temporary nature of the firebreak. Resource concerns include: Wildfire hazard from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, and Habitat degradation.

**Before Situation:**

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Installation will be accomplished by making two passes with the use of typical farm equipment such as tractors, plows, disks, or similar implements.

**After Situation:**

The property is adequately protected from wildfire or can be safely prescribe burned. 20 ac field is 660' x 1320'. Perimeter of about 3960'. Round to 4000'

**Feature Measure:** Length of firebreak

**Scenario Unit::** Foot

**Scenario Typical Size:** 4,000.0

**Scenario Total Cost:** $154.06

**Scenario Cost/Unit:** $0.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 2 | $21.88 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 2 | $32.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |

**Practice:** 394 - Firebreak

**Scenario** #2 - Constructed, Medium equipment, Flat-medium slopes

**Scenario Description:**

Use of medium equipment such as small dozers to blade, disk, plow, etc. bare-soil firebreaks on slopes less than 15%. Generally, water control devices such as water bars are limited to 10 or less per 1,000 feet when properly planned and installed using the same equipment. Resource concerns include: Wildfire hazards from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, and Habitat degradation.

**Before Situation:**

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Conditions such as topography, the presence of brush and trees, etc. make the use of typical farm equipment impractical.

**After Situation:**

The property is adequately protected from wildfire or can be safely prescribe burned and the potential for excessive erosion from the firebreak is negligible.

**Feature Measure:** Length of firebreak

**Scenario Unit::** Foot

**Scenario Typical Size:** 3,000.0

**Scenario Total Cost:** $1,150.77

**Scenario Cost/Unit:** $0.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 4 | $259.68 |
| Water Bars | 1500 | Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length. | Foot | $2.94 | 150 | $441.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 5 | $200.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 394 - Firebreak

**Scenario** #3 - Constructed, Medium equipment, Steep slopes

**Scenario Description:**

Use of equipment such as small dozers to blade bare-soil firebreaks on slopes greater than 15%. Water control devices such as water bars placed at approximately 15 to 25 per 1,000 ft section of firebreak, are necessary to control erosion. These will be installed with the same equipment. Resource concerns include: Wildfire hazard from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, Habitat degradation, Soil erosion, and Excessive sediment in surface waters.

**Before Situation:**

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Conditions such as topography, the presence of brush and trees, etc. make the use of typical farm equipment impractical. As slopes increase, the potential for excessive erosion increases from soil disturbances. Therefore the installation of water control devices such as water bars will be important in protecting the resource base.

**After Situation:**

The property is adequately protected from wildfire or can be safely prescribe burned and the potential for excessive erosion from the firebreak is minimized.

**Feature Measure:** Length of firebreak

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $1,959.27

**Scenario Cost/Unit:** $1.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 4 | $259.68 |
| Water Bars | 1500 | Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length. | Foot | $2.94 | 425 | $1,249.50 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 5 | $200.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 394 - Firebreak

**Scenario** #4 - Constructed, Wide, Bladed or disked

**Scenario Description:**

Installing a bare-ground firebreak with a width of 30' or more on gently to strongly sloping slopes with equipment such as a dozer with a heavy disk. Using smaller equipment, erosion control devices such as water bars will be installed at approximately 15 to 25 per 1,000 feet of firebreak length. Devices will have stable outlets. Resource concerns include: Wildfire hazard from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, Habitat degradation, Soil erosion, and Excessive sediment in surface waters.

**Before Situation:**

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Wide firebreaks are needed due to topography, high wildfire risk or to their use as down-wind breaks for prescribed burns. Conditions such as topography, the presence of brush and trees, etc. make the use of typical farm equipment impractical. As slopes increase, the potential for excessive erosion increases from soil disturbances. Therefore the installation of water control devices such as water bars will be important in protecting the resource base.

**After Situation:**

The property is adequately protected from wildfire or can be safely prescribe burned and the potential for excessive erosion from the firebreak is minimized.

**Feature Measure:** Length of firebreak

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $5,433.44

**Scenario Cost/Unit:** $5.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 10 | $649.20 |
| Fire Plow | 1306 | Heavy wildland plow or disk used for installing firebreaks. Equipment costs only for plow, use with a dozer component. Labor not included. | Hour | $49.17 | 10 | $491.70 |
| Water Bars | 1500 | Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length. | Foot | $2.94 | 875 | $2,572.50 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 18 | $722.88 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |

**Practice:** 394 - Firebreak

**Scenario** #5 - Vegetated, permanent

**Scenario Description:**

Establishing a 20 foot wide strip of permanent vegetation that will serve as a green firebreak. Scenario includes clearing the site, preparing the seedbed, seeding (typically cool season grasses and/or legumes), and applying needed soil amendments. Clearing will be achieved with the use of a bush hog or similar equipment. Seedbed preparation and vegetation establishment will be accomplished with farm equipment. Soil amendments will be applied according to local FOTG guidance. This scenario does not include follow-up maintenance operations such as weed control. mowing, etc. Resource concerns include: Wildfire hazard from excessive biomass accumulation, Soil erosion, and Excessive sediment in surface waters.

**Before Situation:**

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn.

**After Situation:**

The property is adequately protected from wildfire or can be safely prescribe burned. Wildlife habitat will also be enhanced and the potential for erosion from the firebreak is minimized.

**Feature Measure:** Length of firebreak

**Scenario Unit::** Foot

**Scenario Typical Size:** 3,000.0

**Scenario Total Cost:** $1,281.92

**Scenario Cost/Unit:** $0.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 4 | $203.84 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1.5 | $16.41 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 1.5 | $24.45 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 1.5 | $9.75 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 1.5 | $15.66 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1.5 | $31.46 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 5 | $142.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4 | $108.48 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 70 | $31.50 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 70 | $28.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 1 | $38.88 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.57 | 1.5 | $47.36 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #1 - Wood placement, Unanchored, On-site sources

**Scenario Description:**

This scenario involves placement of large wood (logs, root wads, log structures) into a stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. Typical stream reach = 100 feet. A stream assessment (i.e. Stream Visual Assessment Protocol or other approved assessment) documents habitat components lacking for aquatic species (i.e. large wood, pools). Site has sufficient resources to drop wood existing on-site to be anchored in the streambank. A project design for wood placement will be based on assessment of the target stream reach characteristics and those of a suitable reference reach. Large wood/trees with rootwads intact should be placed in streams to create pool habitat according to NRCS engineering specifications and with close review & approval of a fish habitat biologist and geomorphologist to ensure safety and stability of project.

**Before Situation:**

In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 overall. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream and riparian habitat components, such as large wood.

**After Situation:**

Stream habitat within the project reach is improving as a result of placing logs, root wads, and/or wood structures in the channel and/or along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving. The planned activity will meet the current 395 standard, and facilitating practice standards utilized, including timing of work windows required for protected aquatic and riparian species, and protecting/restoring vegetation and substrates of/to areas impacted by heavy equipment.

**Feature Measure:** 100 foot stream reach

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,675.72

**Scenario Cost/Unit:** $3,675.72

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 8 | $1,291.52 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Compost | 265 | A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients. | Ton | $41.44 | 1 | $41.44 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 30 | $16.80 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #2 - Wood placement, Unanchored, Off-site sources

**Scenario Description:**

This scenario involves placement of large wood (logs, root wads, log structures) into a stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. Typical stream reach = 100 feet. A stream assessment (i.e. Stream Visual Assessment Protocol or other approved assessment) documents habitat components lacking for aquatic species (i.e. large wood, pools). The land owner does not have sufficient timber resources to obtain wood from their own parcel(s). Logs/root wads must be purchased and transported in from an off-site location. A project design for wood placement will be based on assessment of the target stream reach characteristics and those of a suitable reference reach. Large wood/trees with rootwads intact should be placed in streams to create pool habitat according to NRCS engineering specifications and with close review & approval of a fish habitat biologist and geomorphologist to ensure safety and stability of project.

**Before Situation:**

In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 overall. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream and riparian habitat components, such as large wood.

**After Situation:**

Stream habitat within the project reach is improving as a result of placing logs, root wads, and/or wood structures in the channel and/or along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving. The planned activity will meet the current 395 standard, and facilitating practice standards utilized, including timing of work windows required for protected aquatic and riparian species, and protecting/restoring vegetation and substrates of/to areas impacted by heavy equipment.

**Feature Measure:** 100 foot stream reach

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $9,274.12

**Scenario Cost/Unit:** $9,274.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 8 | $1,291.52 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 16 | $1,519.20 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 24 | $963.84 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Compost | 265 | A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients. | Ton | $41.44 | 1 | $41.44 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 30 | $16.80 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 12 | $2,779.08 |
| Root Wad | 2045 | Tree stump buried into the streambank with the roots left exposed. Includes material only. | Ton | $9.08 | 20 | $181.60 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #3 - Anchored wood placement from on-site sources

**Scenario Description:**

This scenario involves placement of large wood (logs, root wads, log structures) into a stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. Typical stream reach = 100 feet. A stream assessment (i.e. Stream Visual Assessment Protocol or other approved assessment) documents habitat components lacking for aquatic species (i.e. large wood, pools). The land owners parcel has sufficient resources to obtain wood to be anchored in the stream. Timber is not purchased and does not require long-distance hauling; some hauling across and around clients property is assumed necessary in this scenario. A project design for wood placement will be based on assessment of the target stream reach characteristics and those of a suitable reference reach. Large wood/trees with rootwads intact should be placed in streams to create pool habitat according to NRCS engineering specifications and with close review & approval of a fish habitat biologist. Boulders placed to provide ballast shall only be used if the geomorphic setting and project design demand this component.

**Before Situation:**

In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by an approved stream assessment (i.e., SVAP, WHEG, other Agency assessments). The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream and riparian habitat components, such as large wood.

**After Situation:**

Stream habitat within the project reach is improving as a result of placing logs, root wads, and/or wood structures in the channel and/or along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving. The planned activity will meet the current 395 standard, and facilitating practice standards utilized, including timing of work windows required for protected aquatic and riparian species, and protecting/restoring vegetation and substrates of/to areas impacted by heavy equipment.

**Feature Measure:** 100 foot stream reach

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,664.46

**Scenario Cost/Unit:** $7,664.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 8 | $1,291.52 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 8 | $759.60 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 16 | $642.56 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 12 | $567.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Compost | 265 | A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients. | Ton | $41.44 | 1 | $41.44 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 30 | $16.80 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 40 | $1,398.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 15 | $358.50 |
| Steel cable grips, lockable, 1/4" | 2181 | Lockable wire rope grips for 1/4" galvanized steel cable. Materials and shipping only. | Each | $6.04 | 10 | $60.40 |
| Cable, Galvanized steel | 2182 | Galvanized steel aircraft cable in 7 x 19 strand core. Materials and shipping only. | Foot | $0.48 | 100 | $48.00 |
| **Mobilization** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #4 - Anchored wood placement from off-site sources

**Scenario Description:**

This scenario involves placement of large wood (logs, root wads, log structures) into a stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. Typical stream reach = 100 feet. A stream assessment (i.e. Stream Visual Assessment Protocol or other approved assessment) documents habitat components lacking for aquatic species (i.e. large wood, pools). The land owner does not have sufficient timber resources to obtain wood from their own parcel(s). Logs/root wads must be purchased and transported in from an off-site location. A project design for wood placement will be based on assessment of the target stream reach characteristics and those of a suitable reference reach. Large wood and root wads placed into the stream will mimic genus, age, and size of mature trees found in intact, reference riparian areas in the MLRA where the project is located. Large wood/trees with rootwads intact should be placed in streams to create pool habitat according to NRCS engineering specifications and with close review & approval of a fish habitat biologist. Boulders placed to provide ballast shall only be used if the geomorphic setting and project design demand this component.

**Before Situation:**

In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by an approved stream assessment (i.e., SVAP, WHEG, other Agency assessments). The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream and riparian habitat components, such as large wood.

**After Situation:**

Stream habitat within the project reach is improving as a result of placing logs, root wads, and/or wood structures in the channel and/or along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving. The planned activity will meet the current 395 standard, and facilitating practice standards utilized, including timing of work windows required for protected aquatic and riparian species, and protecting/restoring vegetation and substrates of/to areas impacted by heavy equipment.

**Feature Measure:** 100 foot stream reach

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $14,257.98

**Scenario Cost/Unit:** $14,257.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 16 | $2,583.04 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 16 | $1,519.20 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 32 | $1,249.92 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 32 | $1,285.12 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 30 | $854.70 |
| Compost | 265 | A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients. | Ton | $41.44 | 1 | $41.44 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 30 | $16.80 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 40 | $1,398.00 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.53 | 50 | $26.50 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 15 | $358.50 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 12 | $2,779.08 |
| Root Wad | 2045 | Tree stump buried into the streambank with the roots left exposed. Includes material only. | Ton | $9.08 | 20 | $181.60 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Steel cable grips, lockable, 1/4" | 2181 | Lockable wire rope grips for 1/4" galvanized steel cable. Materials and shipping only. | Each | $6.04 | 10 | $60.40 |
| Cable, Galvanized steel | 2182 | Galvanized steel aircraft cable in 7 x 19 strand core. Materials and shipping only. | Foot | $0.48 | 100 | $48.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #5 - Instream rock placement

**Scenario Description:**

This scenario describes the implementation of a stream habitat improvement and management project that places individual boulders or boulder clusters, or rock structures in or adjacent to the stream channel as habitat components. A project design for boulder placement will be based on assessment of the target stream reach characteristics and those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large rocks/boulders placed in the stream channel will mimic geologic material sizes typically present in the watershed or observed in intact, reference stream reaches in the MLRA where the project is located. Boulders should be placed in streams to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during implementation of the project design. Spawning gravel placement should be placed to restore spawning area substrates potentially disturbed by rock placement. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, spawning habitat, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of stream habitat assessment, and project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required.

**Before Situation:**

In this stream reach, habitat for fish, aquatic insects and other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 overall. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may be also compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream and riparian habitat components, such as large wood, leaf matter, and shade.

**After Situation:**

Stream habitat within the project reach is improving as a result of placing boulders or constructing rock structures in the channel and/or along the stream bank. Hydraulic complexity of the habitat in the reach is increased, and hiding cover, food availability and refuge habitat for stream species is improving. Streambank vegetation is increasing and contributing to stability of the streambanks.

**Feature Measure:** 100 foot stream reach

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $17,620.48

**Scenario Cost/Unit:** $17,620.48

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 16 | $2,583.04 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 8 | $759.60 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 80 | $3,124.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 24 | $963.84 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 24 | $2,711.28 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 120 | $3,418.80 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.74 | 30 | $532.20 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 60 | $2,097.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 20 | $478.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #6 - Rock and wood structures

**Scenario Description:**

This scenario describes the implementation of a stream habitat improvement and management project where practices are focused on instream habitat improvement with a combination of rock AND wood structures. This scenario involves placement of large wood and rock structures into a stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools ) are not currently present in the stream or are limited for aquatic species. Large rocks/boulders placed in the stream channel will mimic geologic material sizes typically present in the watershed or observed in intact, reference stream reaches in the MLRA where the project is located. Rock boulder sizes should also reflect the geomorphic setting of the stream reach. Large wood placed into the stream under this scenario should be similar in species, age, and size (diameter) as trees found in the surrounding riparian area, to the extent possible. Wood, boulders and/or boulder clusters will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during the planning and implementation of the project. This scenario involves restoring one acre of stream. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required.

**Before Situation:**

In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream habitat components, such as large wood and off-channel refuge habitat.

**After Situation:**

Stream habitat within the project reach is improving as a result of placing logs, rocks, or constructing wood and rock structures in the channel and/or along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving.

**Feature Measure:** 100 foot stream reach

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $19,316.36

**Scenario Cost/Unit:** $19,316.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 16 | $2,583.04 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 16 | $1,519.20 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 32 | $1,249.92 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 32 | $1,285.12 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 17 | $477.87 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 60 | $1,709.40 |
| Compost | 265 | A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients. | Ton | $41.44 | 1 | $41.44 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.74 | 300 | $5,322.00 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 40 | $1,398.00 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.53 | 8 | $4.24 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 7 | $167.30 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 5 | $1,157.95 |
| Root Wad | 2045 | Tree stump buried into the streambank with the roots left exposed. Includes material only. | Ton | $9.08 | 10 | $90.80 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #19 - Engineered Log Jam (ELJ), Medium

**Scenario Description:**

This scenario involves placement of engineered log jam (ELJ) structures into a stream channel in order to improve aquatic habitat that currently does not meet planning criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol or other approved assessment) documents habitat components are lacking for aquatic species (i.e. large wood, pools). Large wood will be placed in the stream channel to mimic natural log jams and geologic material sizes typically present in the watershed. Structures will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications, and with close review and approval of a fish habitat biologist to confirm habitat objectives are met. Medium ELJs will consist of between 5 and 15 key member logs, with key member logs defined as logs installed with ballast and/or anchoring mechanism. Additional slash and racking material is often added to the ELJ for increased habitat complexity. Typical stream reach = 100 feet. Logs and logs with root wads are purchased and transported to construction site from an off-site location. All vegetation establishment associated with this scenario will be implemented under the appropriate planting practice. Resource concern: Inadequate Habitat for Fish and Wildlife - Habitat Degradation.

**Before Situation:**

In this stream reach, habitat for aquatic organisms (e.g. fish, aquatic insects and/or other stream species) is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 7 overall. The site does not have adequate food, cover, and/or habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream and riparian habitat components, such as large wood.

**After Situation:**

Stream habitat within the project reach is improving as a result of placing ELJ structure(s) in the channel and/or along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving. The planned activity will meet the current 395 standard, and facilitating practice standards utilized.

**Feature Measure:** 100 foot stream reach

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $33,788.56

**Scenario Cost/Unit:** $33,788.56

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 48 | $7,749.12 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 16 | $1,519.20 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 64 | $2,570.24 |
| **Materials** | | | | | | |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 40 | $1,398.00 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 72 | $16,674.48 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #20 - Engineered Log Jam (ELJ), Large

**Scenario Description:**

This scenario involves placement of engineered log jam (ELJ) structures into a stream channel in order to improve aquatic habitat that currently does not meet planning criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol or other approved assessment) documents habitat components are lacking for aquatic species (i.e. large wood, pools). Large wood will be placed in the stream channel to mimic natural log jams and geologic material sizes typically present in the watershed. Structures will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications, and with close review and approval of a fish habitat biologist to confirm habitat objectives are met. Large ELJs will consist of between 15 or more key member logs, with key member logs defined as logs installed with ballast and/or anchoring mechanism. Additional slash and racking material is often added to the ELJ for increased habitat complexity. Typical stream reach = 100 feet. Logs and logs with root wads are purchased and transported to construction site from an off-site location. All vegetation establishment associated with this scenario will be implemented under the appropriate planting practice. Resource concern: Inadequate Habitat for Fish and Wildlife - Habitat Degradation.

**Before Situation:**

n this stream reach, habitat for aquatic organisms (e.g. fish, aquatic insects and/or other stream species) is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 7 overall. The site does not have adequate food, cover, and/or habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream and riparian habitat components, such as large wood.

**After Situation:**

Stream habitat within the project reach is improving as a result of placing ELJ structure(s) in the channel and/or along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving. The planned activity will meet the current 395 standard, and facilitating practice standards utilized.

**Feature Measure:** 100 foot stream reach

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $66,625.20

**Scenario Cost/Unit:** $66,625.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 96 | $15,498.24 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 32 | $3,038.40 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 80 | $3,124.80 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 96 | $2,726.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 128 | $5,140.48 |
| **Materials** | | | | | | |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 80 | $2,796.00 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 144 | $33,348.96 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #1 - Earthen Dam Removal

**Scenario Description:**

Full or partial removal of an earthen dam to restore aquatic organism passage, improve water quality, and promote functional river ecology and geomorphology. Removal is completed with an assortment of equipment, including tracked excavators outfitted with hydraulic chisels, hammers and/or buckets with "thumbs", bull dozers, skid steers, cranes, front-end loaders, and dump trucks. Disturbed areas are revegetated with a mix of site-adapted species. Seeding should be contracted under 342 Critical Area Planting Scenario does not include additional measures needed in the active channel and floodplain to account for post-removal changes to stream plan, pattern, or profile, or reclamation of any former impounded areas. Additional structural measures may be necessary to address constructed features associated with the removed dam including canals, raceways, adjacent spillways, navigation locks, access and maintenance roads, or similar civil works. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature. Associated Practices include (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

**Before Situation:**

A channel-spanning earthen dam no longer has functional use, may be failing, or creates a hazard to downstream capital infrastructure or communities. The dam blocks upstream aquatic organism migration, and downstream migrants may be diverted into hydraulic structures that increase mortality or result in migration delays or dead-ends. The dam disrupts the downstream cycling and transport of sediment, woody material and nutrients. The pool created by the dam may impair water quality by increasing temperatures, capturing fine sediment--sometimes laden with heavy metals or other pollutants--later mobilized by high flow events, and creating slackwater habitat for invasive aquatic vegetation. Non-native or exotic fish species inhabit the pool and predate upon and/or displace native fish.

**After Situation:**

The existing dam is removed and reach geometry and slope are restored to pre-dam conditions to the fullest extent practicable. Aquatic organism passage and river ecology and geomorphic conditions are restored to pre-dam conditions to the fullest extent practicable. Resource Concerns are addressed within the context of the site. Typical scenario is for the removal of a dam that is 8' high by 4' wide and 200' long and for removal of abutments and associated materials.

**Feature Measure:** Cubic Yards of concrete removed

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 250.0

**Scenario Total Cost:** $44,353.79

**Scenario Cost/Unit:** $177.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $307.21 | 3 | $921.63 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 40 | $4,870.00 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 64 | $10,332.16 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 8 | $1,709.20 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 64 | $6,076.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 64 | $1,817.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 168 | $6,746.88 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #2 - Concrete Dam Removal

**Scenario Description:**

Full or partial removal of a concrete dam to restore aquatic organism passage, improve water quality, and promote functional river ecology and geomorphology. Removal is completed with an assortment of equipment, including tracked excavators outfitted with hydraulic chisels, hammers and/or buckets with "thumbs", bull dozers, skid steers, cranes, front-end loaders, and dump trucks. Disturbed areas are revegetated with a mix of site-adapted species. Seeding should be contracted under 342 Critical Area Planting Scenario does not include additional measures needed in the active channel and floodplain to account for post-removal changes to stream plan, pattern, or profile, or reclamation of any former impounded areas. Additional structural measures may be necessary to address constructed features associated with the removed dam including canals, raceways, adjacent spillways, navigation locks, access and maintenance roads, or similar civil works. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature. Associated Practices include (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

**Before Situation:**

A channel-spanning concrete dam no longer has functional use, may be failing, or creates a hazard to downstream capital infrastructure or communities. The dam blocks upstream aquatic organism migration, and downstream migrants may be diverted into hydraulic structures that increase mortality or result in migration delays or dead-ends. The dam disrupts the downstream cycling and transport of sediment, woody material and nutrients. The pool created by the dam may impair water quality by increasing temperatures, capturing fine sediment--sometimes laden with heavy metals or other pollutants--later mobilized by high flow events, and creating slackwater habitat for invasive aquatic vegetation. Non-native or exotic fish species inhabit the pool and predate upon and/or displace native fish.

**After Situation:**

The existing dam is removed and reach geometry and slope are restored to pre-dam conditions to the fullest extent practicable. Aquatic organism passage and river ecology and geomorphic conditions are restored to pre-dam conditions to the fullest extent practicable. Resource Concerns are addressed within the context of the site. Typical scenario is for the removal of a dam that is 8' high by 4' wide and 200' long and for removal of abutments and associated materials.

**Feature Measure:** Cubic Yards of concrete removed

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 250.0

**Scenario Total Cost:** $53,853.63

**Scenario Cost/Unit:** $215.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $307.21 | 3 | $921.63 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 64 | $7,792.00 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 64 | $10,332.16 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 24 | $5,127.60 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 64 | $6,076.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 128 | $3,635.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 192 | $7,710.72 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 48 | $2,268.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #3 - Concrete Dam Removal with Blasting

**Scenario Description:**

Full or partial removal of a concrete dam on a site requiring blasting to break up the concrete structure prior to removal. Removal of the dam will restore aquatic organism passage, improve water quality, and promote functional river ecology and geomorphology. Removal is completed with an assortment of equipment, including tracked excavators outfitted with hydraulic chisels, hammers and/or buckets with "thumbs", bull dozers, skid steers, cranes, front-end loaders, and dump trucks. Disturbed areas are revegetated with a mix of site-adapted species. Seeding should be contracted under 342 Critical Area Planting Scenario does not include additional measures needed in the active channel and floodplain to account for post-removal changes to stream plan, pattern, or profile, or reclamation of any former impounded areas. Additional structural measures may be necessary to address constructed features associated with the removed dam including canals, raceways, adjacent spillways, navigation locks, access and maintenance roads, or similar civil works. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature. Associated Practices include (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

**Before Situation:**

A channel-spanning concrete dam no longer has functional use, may be failing, or creates a hazard to downstream capital infrastructure or communities. The dam blocks upstream aquatic organism migration, and downstream migrants may be diverted into hydraulic structures that increase mortality or result in migration delays or dead-ends. The dam disrupts the downstream cycling and transport of sediment, woody material and nutrients. The pool created by the dam may impair water quality by increasing temperatures, capturing fine sediment--sometimes laden with heavy metals or other pollutants--later mobilized by high flow events, and creating slackwater habitat for invasive aquatic vegetation. Non-native or exotic fish species inhabit the pool and predate upon and/or displace native fish.

**After Situation:**

The existing dam is removed and reach geometry and slope are restored to pre-dam conditions to the fullest extent practicable. Aquatic organism passage and river ecology and geomorphic conditions are restored to pre-dam conditions to the fullest extent practicable. Resource Concerns are addressed within the context of the site. Typical scenario is for the removal of a dam that is 8' high by 4' wide and 200' long (237 cubic yards) and for removal of abutments and associated materials.

**Feature Measure:** Cubic Yards of concrete removed

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 237.0

**Scenario Total Cost:** $57,914.39

**Scenario Cost/Unit:** $244.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $307.21 | 3 | $921.63 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 40 | $4,870.00 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 64 | $10,332.16 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 30 | $6,409.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 64 | $6,076.80 |
| Drilling & Blasting Rock, Open Face. | 1396 | Open Face drilling & blasting of rock (typically a min. 225 CY, Max 1500 CY). Includes all equipment, labor and supplies to complete the blast. | Cubic Yard | $14.70 | 237 | $3,483.90 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 240 | $6,816.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 168 | $6,746.88 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 48 | $2,268.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #4 - Roughened Channel

**Scenario Description:**

Roughened channels, rock ramps, or bypass channels, are constructed features that provide passage around an instream barrier or in place of a removed barrier. Roughened Channels are constructed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Removed materials are trucked away and disposed or recycled off-site, unless excavated native streambed material can be used in fishway construction. Scenario does not include additional measures needed in the active channel and floodplain or at an existing dam necessary to control flow associated with nature-like fishway. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, 580 Streambank and Shoreline Protection, (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control580 Streambank and Shoreline Protection

**Before Situation:**

An instream barrier prevents upstream migration of native aquatic organisms and no support exists for removal.

**After Situation:**

A roughened channel is constructed in place of a removed barrier or around an existing barrier. The fishway is designed to mimic the adjacent natural stream, and is constructed of rock and/or large woody material that provides quality passage conditions for a number of species and geomorphic stability over a range of flows. Resource Concerns are addressed within the context of the site. Typical scenario is for a 20' wide by 200' long roughened channel.

**Feature Measure:** Square feet of constructed fishway

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,000.0

**Scenario Total Cost:** $92,471.45

**Scenario Cost/Unit:** $23.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $307.21 | 3 | $921.63 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 80 | $12,915.20 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 30 | $6,409.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 80 | $7,596.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 240 | $6,816.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 160 | $6,425.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 64 | $3,024.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 400 | $12,616.00 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 60 | $2,097.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 990 | $23,661.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #5 - CMP Culvert, <=8ft

**Scenario Description:**

A corrugated metal (galvanized steel or aluminum) pipe culvert (CMP) less than or equal to 8' in diameter of any shape (round, elliptical, or squash) used at a road-stream crossing to provide aquatic organism passage (AOP) and promote stream ecological and geomorphic function. CMPs are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences. This work would be contracted under open channel or stream channel stabilization. Stream dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices include: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment;(395) Stream Habitat Improvement and Management; (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. The existing crossing does not meet State or Federal fish passage guidance.

**After Situation:**

The undersized culvert is replaced with a CMP sized and designed in accordance to State, Federal and NRCS fish passage guidance and requirements. Resource Concerns are addressed within the context of the site. Typical scenario is for a 6' diameter pipe with 4' of fill over the top. 15' road top width with 2.5:1 slopes for a total pipe length of 65'.

**Feature Measure:** Foot of pipe length

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $43,689.78

**Scenario Cost/Unit:** $873.80

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 56 | $9,040.64 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 10 | $2,136.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 56 | $5,317.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 112 | $4,497.92 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Pipe, CMP, 14-12 gauge, weight priced | 1589 | 14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.15 | 6600 | $7,590.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 40 | $956.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #6 - CMP Culvert <=8ft, Foundation Modification

**Scenario Description:**

A corrugated metal (galvanized steel or aluminum) pipe culvert (CMP) less than 8' in diameter of any shape (round, elliptical, or squash) used at a road-stream crossing or within an existing levee to provide aquatic organism passage (AOP) and restore or promote estuary ecological and hydrogeomorphic function. Often associated with installation of a Self Regulating Tidegate (SRT) or on projects located in alluvial, estuarine, or tidally influenced areas, where soils are considered "soft" with low bearing capacity and high potential for settlement or consolidation. These projects typically require a large quantity of over-excavation to remove unsuitable soils, backfill with engineered fill material, and manual compaction to support a new culvert/structure for fish passage. CMPs are installed with an assortment of equipment, sequencing, and methods used when working in aquatic soil environments such as over excavation, placing engineered fill material, and using a high degree of hand compaction to achieve the desired results. Geotechnical investigation is required to utilize this scenario. On site geotechnical testing is required during construction to ensure the required compaction is achieved. Construction in tidal environments offers additional challenges with daily and seasonal low tide requirements. Dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site and is not needed in estuary environments. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices include: (587) Structure for Water Control (SRT), (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment;(395) Stream Habitat Improvement and Management; (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. In estuary environments, the existing WCS is undersized or failing and does not allow adequate fish passage or passage of tidal hydrology. The existing structure does not meet State or Federal fish passage guidance.

**After Situation:**

The undersized culvert/structure is replaced with a CMP sized and designed in accordance to State, Federal and NRCS fish passage guidance and requirements. In estuary environments, a SRT will be installed separately under 587 Structure for Water Control. Resource Concerns are addressed within the context of the site. For streams, fish passage and other stream geomorphic process such as natural sediment and woody debris transport will be restored. For tidal environments, partial fish passage will be restored along with partial tidal hydrology to a level that will not cause off site flooding concerns. Typical scenario is for a 6' diameter pipe with 4' of fill over the top. 15' road top width with 2.5:1 slopes for a total pipe length of 40 ft.

**Feature Measure:** Foot of pipe length

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $49,813.02

**Scenario Cost/Unit:** $996.26

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 70 | $11,300.80 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 12 | $2,563.80 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 70 | $6,646.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 140 | $5,622.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 50 | $982.00 |
| Pipe, CMP, 14-12 gauge, weight priced | 1589 | 14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.15 | 6600 | $7,590.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 40 | $956.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #7 - CMP Culvert, >8ft

**Scenario Description:**

A corrugated metal (galvanized steel or aluminum) pipe culvert (CMP) greater than 8' in diameter of any shape (round, elliptical, or squash) used at a road-stream crossing to provide aquatic organism passage (AOP) and promote stream ecological and geomorphic function. CMPs are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences. Stream dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices include: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment;(395) Stream Habitat Improvement and Management; (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. The existing crossing does not meet State or Federal fish passage guidance.

**After Situation:**

The undersized culvert is replaced with a CMP sized and designed in accordance to State, Federal and NRCS fish passage guidance and requirements. Resource Concerns are addressed within the context of the site. Typical scenario is for a 10' diameter pipe with 4' of fill over the top. 15' road top width with 2.5:1 slopes for a total pipe length of 85'.

**Feature Measure:** Foot of pipe length

**Scenario Unit::** Foot

**Scenario Typical Size:** 60.0

**Scenario Total Cost:** $65,930.16

**Scenario Cost/Unit:** $1,098.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 64 | $10,332.16 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 25 | $5,341.25 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 64 | $6,076.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 120 | $3,408.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 128 | $5,140.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 64 | $3,024.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Pipe, CMP, 14-12 gauge, weight priced | 1589 | 14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.15 | 13200 | $15,180.00 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 167 | $5,836.65 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 67 | $1,601.30 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #8 - Bottomless Culvert <= 8ft span

**Scenario Description:**

A multi-plate galvanized steel or aluminum culvert (arch or box) with a span of 8' or less is installed at a road-stream crossing to provide aquatic organism passage (AOP) and promote stream ecological and geomorphic function. They commonly attach to preformed reinforced or poured-in-place concrete footings. CMPs are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences. This work would be contracted under open channel or stream channel stabilization. Stream dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices include: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment;(395) Stream Habitat Improvement and Management; (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. The existing crossing does not meet State or Federal fish passage guidance.

**After Situation:**

The undersized culvert is replaced with a with a bottomless arch or box culvert sized and designed in accordance to State, Federal and NRCS fish passage guidance and requirements. Resource Concerns are addressed within the context of the site. Typical scenario is for a 6' span 10 gauge multiplate arch culvert with a rise of 3' 2" with 4' of fill over the top. 15' road top width with 2.5:1 slopes for a total pipe length of 50'.

**Feature Measure:** Foot of pipe length

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $52,279.71

**Scenario Cost/Unit:** $1,045.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 80 | $12,915.20 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 10 | $2,136.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 80 | $7,596.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 160 | $6,425.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 69 | $2,176.26 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 40 | $956.00 |
| Culvert, Multi-Plate arch | 1979 | Multi-plate arch culvert, typically 7 Gauge corrugated plate. Includes metal arch materials only, does not include footings. | Pound | $1.47 | 4029 | $5,922.63 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #9 - Bottomless Culvert >8ft span

**Scenario Description:**

A multi-plate galvanized steel or aluminum culvert (arch or box) with a span of greater than 8' is installed at a road-stream crossing to provide aquatic organism passage (AOP) and promote stream ecological and geomorphic function. They commonly attach to preformed reinforced or poured-in-place concrete footings. CMPs are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences. This work would be contracted under open channel or stream channel stabilization. Stream dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices include: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment;(395) Stream Habitat Improvement and Management; (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. The existing crossing does not meet State or Federal fish passage guidance.

**After Situation:**

The undersized culvert is replaced with a with a bottomless arch or box culvert sized and designed in accordance to State, Federal and NRCS fish passage guidance and requirements. Resource Concerns are addressed within the context of the site. Typical scenario is for a 10' span 10 gauge multiplate arch culvert with a rise of 5' 3" with 4' of fill over the top. 15' road top width with 2.5:1 slopes for a total pipe length of 60'.

**Feature Measure:** Foot of pipe length

**Scenario Unit::** Foot

**Scenario Typical Size:** 60.0

**Scenario Total Cost:** $65,956.34

**Scenario Cost/Unit:** $1,099.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 80 | $12,915.20 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 30 | $6,409.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 80 | $7,596.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 160 | $4,544.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 160 | $6,425.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 81 | $2,554.74 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 67 | $1,601.30 |
| Culvert, Multi-Plate arch | 1979 | Multi-plate arch culvert, typically 7 Gauge corrugated plate. Includes metal arch materials only, does not include footings. | Pound | $1.47 | 8184 | $12,030.48 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #10 - Concrete Box Culvert

**Scenario Description:**

A four-sided precast concrete box (square or rectangular) culvert used at a road-stream crossing to provide aquatic organism passage (AOP) and promote stream ecological and geomorphic function. Concrete headwalls and/or wingwalls may be necessary in shorter installations and/or where fill/roadway cover is limited or the stream alignment is not perpendicular to the road axis. Concrete box culverts are delivered in sections and assembled onsite, and require adequate bed compaction throughout the crossing section. They are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Stream dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site. The new streambed is set at a slope that matches the design longitudinal profile, and backfilled with a bed mixture that mimics adjacent stream characteristics with special attention to channel pattern. The roadway is replaced and any necessary armoring and revegetating material is placed at the culvert inlet and outlet where it intersects the road fill prism. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices include: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment;(395) Stream Habitat Improvement and Management; (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. The existing crossing does not meet State or Federal fish passage guidance.

**After Situation:**

The undersized culvert is replaced with a concrete box culvert sized and designed in accordance to State, Federal and NRCS fish passage guidance and requirements. Resource Concerns are addressed within the context of the site. Typical scenario is for a 6' by 6' x 40' long concrete box culvert.

**Feature Measure:** Foot of culvert length

**Scenario Unit::** Foot

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $73,817.52

**Scenario Cost/Unit:** $1,845.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 80 | $12,915.20 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 30 | $6,409.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 80 | $7,596.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 240 | $6,816.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 160 | $6,425.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 80 | $3,780.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 120 | $13,556.40 |
| **Materials** | | | | | | |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 75 | $1,792.50 |
| Culvert, box, 6' x 6' | 1837 | Precast concrete box culvert, 6'X6'. Typically in 4' sections. Includes materials only. | Foot | $339.36 | 40 | $13,574.40 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #13 - Bridge, Manufactured

**Scenario Description:**

A channel-spanning structure constructed from a manufactured concrete or steel bridge structure that has been certified by a PE that carries a road or trailway across a river or stream. Bridge design is completed to conform to loading requirements and site conditions. The bridge deck is designed to rest on abutments placed on the adjacent floodplain. Bridge components are delivered to the site and assembled by a combination of equipment and manual labor. They are installed with an assortment of equipment used for excavation, placing material, delivering and removing material, and lifting bridge components from delivery trucks onto the constructed bridge support elements. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert (if applicable), and topsoil conservation for site reclamation. Channel diversion or dewatering is required since an existing blockage will be removed for bridge construction. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the bridge crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. The existing crossing does not meet State or Federal fish passage guidance.

**After Situation:**

The undersized culvert is replaced with a manufactured bridge placed on precast concrete abutments. The bridge deck is composed of concrete or steel and elevated, continuous railings run down each side connecting one abutment to its counterpart on the opposite bank. Signs on either approach indicate bridge capacity and weight restrictions. Because the bridge spans the active channel and sits atop the adjacent floodplain surface, geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. Resource Concerns are addressed within the context of the site. Typical Scenario is for a 30' span bridge 15' wide on precast concrete abutments.

**Feature Measure:** Linear feet of bridge deck

**Scenario Unit::** Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $69,219.34

**Scenario Cost/Unit:** $2,307.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 18 | $7,865.82 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 40 | $6,457.60 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 50 | $10,682.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 120 | $3,408.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 20 | $945.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Bridge, steel or concrete, pre-Manufactured Bridge | 2193 | A premanufactured steel or precast prestressed concrete bridge rated for an HS 25 highway loading. Typical width is 14', length is variable. Includes railing system. Includes materials and shipping only. | Square Foot | $62.81 | 450 | $28,264.50 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #14 - Bridge, Manufactured, Foundation Modification

**Scenario Description:**

A channel-spanning structure constructed from a manufactured concrete or steel bridge structure that has been certified by a PE that carries a road or trailway across a river or stream. Bridge design is completed to conform to loading requirements and site conditions. The bridge deck is designed to rest on abutments placed on the adjacent floodplain. Projects located in alluvial, estuarine, or tidally influenced areas, where soils are considered "soft" with low bearing capacity and high potential for settlement or consolidation. These projects typically require a large quantity of over-excavation to remove unsuitable soils, backfill with engineered fill material, and manual compaction to support a new structure for fish passage. Bridge components are delivered to the site and assembled by a combination of equipment and manual labor. They are installed with an assortment of equipment used for excavation, placing material, delivering and removing material, and lifting bridge components from delivery trucks onto the constructed bridge support elements. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert (if applicable), and topsoil conservation for site reclamation. Channel diversion or dewatering is required since an existing blockage will be removed for bridge construction. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the bridge crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. The existing crossing does not meet State or Federal fish passage guidance.

**After Situation:**

The undersized culvert is replaced with a manufactured bridge placed on precast concrete abutments. The bridge deck is composed of concrete or steel and elevated, continuous railings run down each side connecting one abutment to its counterpart on the opposite bank. Signs on either approach indicate bridge capacity and weight restrictions. Because the bridge spans the active channel and sits atop the adjacent floodplain surface, geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. Resource Concerns are addressed within the context of the site. Typical Scenario is for a 30' span bridge 15' wide on precast concrete abutments.

**Feature Measure:** Linear feet of bridge deck

**Scenario Unit::** Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $81,742.84

**Scenario Cost/Unit:** $2,724.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 18 | $7,865.82 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 48 | $7,749.12 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 60 | $12,819.00 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 24 | $2,278.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 180 | $5,112.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 72 | $2,891.52 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 32 | $1,512.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 88 | $9,941.36 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 120 | $2,356.80 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Bridge, steel or concrete, pre-Manufactured Bridge | 2193 | A premanufactured steel or precast prestressed concrete bridge rated for an HS 25 highway loading. Typical width is 14', length is variable. Includes railing system. Includes materials and shipping only. | Square Foot | $62.81 | 450 | $28,264.50 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #15 - Step Pool Weir

**Scenario Description:**

Step pool weirs are constructed features that provide passage around an instream barrier or in place of a removed barrier. Step Pool Weirs are constructed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Disturbed areas are revegetated with a mix of site-adapted species, and access control and signage are provided. Scenario does not include additional measures needed in the active channel and floodplain or at an existing dam necessary to control flow associated with nature-like fishway. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, 580 Streambank and Shoreline Protection, (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control580 Streambank and Shoreline Protection

**Before Situation:**

An instream barrier prevents upstream migration of native aquatic organisms and no support exists for removal. Similarly, an instream barrier is removed, and interested parties require maintenance of an upstream pool or pond.

**After Situation:**

A step pool weir is constructed in place of a removed barrier. The step pool weir is constructed of rock that provides quality passage conditions for a number of species and geomorphic stability over a range of flows. Resource Concerns are addressed within the context of the site. The typical scenario is for a 35' wide channel 100 feet long with weirs every 10'.

**Feature Measure:** Cubic yds of material

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $86,756.26

**Scenario Cost/Unit:** $108.45

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 64 | $10,332.16 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 10 | $2,136.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 64 | $6,076.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 128 | $5,140.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 1200 | $41,940.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 292 | $6,978.80 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #48 - CMP Culvert, >8ft, Foundation Modification

**Scenario Description:**

A corrugated metal (galvanized steel or aluminum) pipe culvert (CMP) greater than 8' in diameter of any shape (round, elliptical, or squash) used at a road-stream crossing or within an existing levee to provide aquatic organism passage (AOP) and restore or promote estuary ecological and hydrogeomorphic function. Often associated with installation of a Self Regulating Tidegate (SRT) or on projects located in alluvial, estuarine, or tidally influenced areas, where soils are considered "soft" with low bearing capacity and high potential for settlement or consolidation. These projects typically require a large quantity of over-excavation to remove unsuitable soils, placement and anchoring of geotextile and geogrid material (both quantified as geotextile components), backfill with engineered fill material, and manual compaction to support a new culvert/structure for fish passage. CMPs are installed with an assortment of equipment, sequencing, and methods used when working in aquatic soil environments such as over excavation, placing engineered fill material, and using a high degree of hand compaction to achieve the desired results. Geotechnical investigation is required to utilize this scenario. On site geotechnical testing is required during construction to ensure the required compaction is achieved. Construction in tidal environments offers additional challenges with daily and seasonal low tide requirements. Dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site and is not needed in estuary environments. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices include: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment;(395) Stream Habitat Improvement and Management; (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. The existing crossing does not meet State or Federal fish passage guidance.

**After Situation:**

The undersized culvert is replaced with a CMP sized and designed in accordance to State, Federal and NRCS fish passage guidance and requirements. Resource Concerns are addressed within the context of the site. Typical scenario is for a 10' diameter pipe countersunk 50% with 4' of fill over the top. 15' road top width with 2.5:1 slopes for a total pipe length of 60'.

**Feature Measure:** Length of culvert

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 60.0

**Scenario Total Cost:** $82,020.66

**Scenario Cost/Unit:** $1,367.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 80 | $12,915.20 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 31 | $6,623.15 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 80 | $7,596.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 120 | $3,408.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 160 | $6,425.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 64 | $3,024.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 226 | $7,128.04 |
| Geotextile, non-woven, heavy weight | 1210 | Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $4.41 | 520 | $2,293.20 |
| Pipe, CMP, 14-12 gauge, weight priced | 1589 | 14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.15 | 13200 | $15,180.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 167 | $5,836.65 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 67 | $1,601.30 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #1 - Check Dams

**Scenario Description:**

Typical setting is on a 40-acre pasture/hayland field having a slope of 5 to 10 percent where ephemeral gullies have formed. Typical installation consists of stabilizing/regrading the gully and installing six check dams with a top width of 3', average height of 2.5', 19' length, and 2:1 side slopes, ; containing an average of 21 tons of rock for a total of 126 tons. The check dams are underlain with geotextile fabric. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as water quality degradation and soil erosion-concentrated flow erosion.

**Before Situation:**

The operator presently has erosion gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed vegetation of disturbed areas use Critical Area Planting (342).

**Feature Measure:** Tons of rock installed

**Scenario Unit::** Ton

**Scenario Typical Size:** 126.0

**Scenario Total Cost:** $6,755.50

**Scenario Cost/Unit:** $53.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, large equipment, 50 ft | 1222 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $1.55 | 160 | $248.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 84 | $5,781.72 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #3 - Embankment, Pipe 8-12 inch

**Scenario Description:**

An earthen embankment dam with a principle spillway pipe between 8 and 12 inches, anti-seep collars or sand diaphragm, and excavated plunge pool basin. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,500 cubic yards, 90 feet of 10" pace, pipe with a canopy inlet, and 3 cubic yard sand diaphragm. A non-lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Cubic Yards of Earthfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $17,536.08

**Scenario Cost/Unit:** $7.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 2500 | $10,925.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 29 | $167.33 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 10 | $1,116.60 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 30 | $1,171.80 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 30 | $852.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 10 | $401.60 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 3 | $84.33 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.38 | 60 | $82.80 |
| Pipe, PVC, 10", SCH 80 | 1351 | Materials: - 10" - PVC - SCH 80 - ASTM D1785 | Foot | $24.08 | 90 | $2,167.20 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #4 - Embankment, Pipe >12 inch

**Scenario Description:**

An earthen embankment dam with a principle spillway pipe greater than 12 inches. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,500 cubic yards, smooth steel drop inlet principle spillway with a 7 ft riser and 90 ft barrel, and 82 Square feet of anti-seep collars. A rock lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Cubic Yards of Earthfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $21,456.04

**Scenario Cost/Unit:** $8.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formless, non reinforced | 36 | Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $138.47 | 1 | $138.47 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 2 | $873.98 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 2500 | $10,925.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 129 | $744.33 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 13 | $1,451.58 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 38 | $1,484.28 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 42 | $1,192.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 13 | $522.08 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 14 | $963.62 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 30 | $28.80 |
| Steel, Plate, 1/8" | 1047 | Flat Steel Plate, 1/8" thick, materials only. | Square Foot | $4.11 | 82 | $337.02 |
| Pipe, Steel, 12", Std Wt, USED | 1356 | Materials: - USED - 12" - Steel Std Wt | Foot | $22.44 | 90 | $2,019.60 |
| Pipe, Steel, 16", Std Wt, USED | 1357 | Materials: - USED - 16" - Steel Std Wt | Foot | $29.58 | 7 | $207.06 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #6 - Pipe Drop, Plastic

**Scenario Description:**

A full flow pipe drop (i.e.: riser and barrel) grade stabilization structure designed and constructed using plastic pipe without anti-seep collars. This is typically a earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon 6 ft high 18" (1.5') PVC riser with a 40 ft long barrel (1.5' x 3.14 x 40' = 188 SF). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Riser Weir Length x Barrel Length

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 188.0

**Scenario Total Cost:** $5,349.08

**Scenario Cost/Unit:** $28.45

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 1 | $436.99 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 100 | $437.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 20 | $115.40 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 2 | $223.32 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 2 | $80.32 |
| **Materials** | | | | | | |
| Pipe, PVC, 18", SCH 40 | 1373 | Materials: - 18" - PVC - SCH 40 - ASTM D1785 | Foot | $40.33 | 40 | $1,613.20 |
| Coupling, PVC, Tee, 24x18, SCH 40 | 1374 | Materials: - Tee, 24"x18" - PVC - SCH 40 - ASTM D1785 | Each | $1,672.52 | 1 | $1,672.52 |
| Pipe, PVC, 24", ASTM-2241, SDR 26 | 1945 | Materials: -24" -PVC - ASTM 2241, SDR 26 | Foot | $37.50 | 6 | $225.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #7 - Pipe Drop, Steel

**Scenario Description:**

A full flow pipe drop (i.e.: riser and barrel) grade stabilization structure designed and constructed with a metal anti-seep collar. This is typically a earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a smooth steel pipe drop structure with a 36", 12' tall riser and a 100' long 30" barrel (Riser Weir length x Barrel Length = 3ft x 3.14 x 30ft = 940). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Riser Weir Length x Barrel Length

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 940.0

**Scenario Total Cost:** $14,478.80

**Scenario Cost/Unit:** $15.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 600 | $2,622.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 100 | $577.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 4 | $446.64 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 11 | $429.66 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| **Materials** | | | | | | |
| Steel, Plate, 1/8" | 1047 | Flat Steel Plate, 1/8" thick, materials only. | Square Foot | $4.11 | 30 | $123.30 |
| Pipe, Steel, 30", Std Wt, USED | 1361 | Materials: - USED - 30" - Steel Std Wt | Foot | $79.47 | 100 | $7,947.00 |
| Pipe, Steel, 36", Std Wt, USED | 1362 | Materials: - USED - 36" - Steel Std Wt | Foot | $101.47 | 12 | $1,217.64 |
| Steel, Plate, 3/8" | 1375 | Flat steel plate, 3/8" thickness. Materials only. | Square Foot | $11.50 | 9 | $103.50 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

## USDA - Natural Resources Conservation Service **Washington**

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #8 - Weir Drop Structures

**Scenario Description:**

A Straight, semicircular, or Box Drop structure composed of metal or reinforced concrete used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a semicircular steel toe wall structure with a drop of 3ft and weir length of 30ft (90 square feet). The unit of payment measurement is defined as weir length times drop in "feet". The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (i.e.: outlet apron elevation).Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Feet of Weir length times Drop Hei

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 90.0

**Scenario Total Cost:** $8,912.24

**Scenario Cost/Unit:** $99.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 9 | $3,932.91 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 9 | $22.95 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 40 | $92.40 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 75 | $327.75 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 5 | $558.30 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 30 | $852.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 5 | $200.80 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 3 | $85.47 |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 11 | $346.94 |
| Corrugated Steel, 12 Gauge, galvanized | 1376 | Corrugated Steel, 12 gauge, 3" by 1" corrugations, galvanized, meets ASTM A 929. Materials only. | Square Foot | $7.46 | 212 | $1,581.52 |
| Pipe, CMP, 12", 14 Gauge | 1377 | 12" - Corrugated Steel Pipe. Galvanized, uncoated. 14 Gauge. Materials only. | Foot | $11.01 | 2 | $22.02 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #9 - Rock Drop Structures

**Scenario Description:**

A Straight Drop structure constructed of rock riprap held in place by galvanized wire, such as, gabion baskets, fence panels, or "sausage" baskets. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a gabion wall structure with a drop of 3ft and weir length of 8ft (48 square feet). The unit of payment measurement is defined as weir length times drop in "feet". The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (i.e.: outlet apron elevation).Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Feet of Weir length times Drop Hei

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 48.0

**Scenario Total Cost:** $3,693.63

**Scenario Cost/Unit:** $76.95

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 23 | $58.65 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 7 | $16.17 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 40 | $174.80 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 5 | $558.30 |
| Tractor, agricultural, 210 HP | 1201 | Agricultural tractor with horsepower range of 190 to 240. Equipment and power unit costs. Labor not included. | Hour | $105.12 | 3 | $315.36 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 5 | $200.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Materials** | | | | | | |
| Gabion basket or mat | 1378 | Gabion baskets or mats installed and filled on grade, includes materials, transport, equipment, and labor, does not include geotextile fabric. | Cubic Yard | $159.21 | 7 | $1,114.47 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #10 - Log Drop Structures

**Scenario Description:**

A Straight Drop structure constructed using bioengineering principles. In this instance the drop structure is constructed of logs, rock riprap, and earthfill. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon an 8 foot weir length and 3 foot drop. The unit of payment measurement is each. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized using an engineered structure utilizing natural materials (bioengineered). The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,534.30

**Scenario Cost/Unit:** $5,534.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 11 | $28.05 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 10 | $23.10 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 40 | $174.80 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 12 | $1,339.92 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 4 | $17.16 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| Tractor, agricultural, 210 HP | 1201 | Agricultural tractor with horsepower range of 190 to 240. Equipment and power unit costs. Labor not included. | Hour | $105.12 | 20 | $2,102.40 |
| Trailer, flatbed, small | 1505 | Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $15.61 | 1 | $15.61 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1 | $27.12 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 12 | $481.92 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 5 | $236.25 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 412 - Grassed Waterway

**Scenario** #1 - Base Waterway

**Scenario Description:**

A grassed waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Waterways area measured from top of bank to top of bank. Costs include excavation and associated work to construct the overall shape and grade of the waterway. Typical practice is 1200 ' long, 12' bottom, 8:1 side slopes, 1.5' depth, half excavation and is typically installed using a dozer. Resource Concerns: Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Use Critical Area Planting (342) for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

**Before Situation:**

Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and/or poor cropping techniques. Runoff from concentrated flows, terraces, diversions, or water control structures or similar practices is in need of a suitable, stable outlet.

**After Situation:**

A grassed waterway is installed (shaped or graded channel) and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Runoff is conveyed from terraces, diversions, or other water concentrations without causing erosion or flooding. Water quality and gully erosion is protected and/or improved.

**Feature Measure:** Acre of Waterway

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,650.14

**Scenario Cost/Unit:** $1,650.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, large equipment, 50 ft | 1222 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $1.55 | 800 | $1,240.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 412 - Grassed Waterway

**Scenario** #2 - Waterway with Checks

**Scenario Description:**

A grassed waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Fabric or stone checks are installed every 100 feet along the length of the waterway perpendicular to waterflow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. Fabric Checks are installed 18" deep with 12" laid over on the surface. (Alternatively, rock checks could be installed). Typical practice is 1200 ' long, 12' bottom, 8:1 side slopes, 1.5' depth, half excavation. Waterway area measured from top of bank to top of bank. Costs include excavation and associated work to construct the overall shape and grade of the waterway. Resource Concerns: Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Use Critical Area Planting (342) for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

**Before Situation:**

Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and/or poor cropping techniques. Runoff from concentrated flows, terraces, diversions, or water control structures or similar practices is in need of a suitable, stable outlet.

**After Situation:**

A grassed waterway is installed (shaped or graded channel) and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Runoff is conveyed from terraces, diversions, or other water concentrations without causing erosion or flooding. Water quality and gully erosion is protected and/or improved.

**Feature Measure:** Acre of Waterway

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,592.74

**Scenario Cost/Unit:** $2,592.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 33 | $76.23 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 33 | $190.41 |
| Excavation, common earth, large equipment, 50 ft | 1222 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $1.55 | 800 | $1,240.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Geotextile, non-woven, light weight | 1209 | Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $1.25 | 132 | $165.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 422 - Hedgerow Planting

**Scenario** #1 - Single Row

**Scenario Description:**

A single row of woody vegetation is planted in a linear design. Hedgerow is used on any land type where it is necessary to address one or more of the following resource concerns: Inadequate Habitat for Fish and Wildlife, reduce emissions of particulate matter; reduce objectionable odors; soil erosion; soil quality degradation. One row of shrubs and/or trees are planted based on State Technical guidance. Some non-competitive tall herbaceous vegetation may also be included. Average height of hedgerow will be at least 3 feet and will extend 15 feet wide at maturity.

**Before Situation:**

One or more of the following resource concerns are identified on the site: soil is lost to sheet and rill erosion; sediments are deposited into surface waters; there is lack of wildlife or pollinator habitat; air or soil quality issues are present.

**After Situation:**

A single-row hedgerow is installed to resolve the identified resource concerns.

**Feature Measure:** Length of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $4,831.23

**Scenario Cost/Unit:** $6.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 25 | $534.75 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 0.75 | $8.21 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.28 | $3.46 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 40 | $494.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| **Materials** | | | | | | |
| Tree or Shrub, band pots, less common species | 1523 | Band pots of less common species trees or shrubs (e.g. Siberian Larch ). Includes materials and shipping only. | Each | $2.55 | 200 | $510.00 |
| Tree shelter, solid tube type, 4" x 36" | 1565 | 4" x 36" tree tube for protection from animal damage. Materials only. | Each | $3.28 | 200 | $656.00 |
| Stakes, wood, 1" x 1" x 36" | 1577 | 1" x 1" x 36" wood stakes to fasten items in place. Includes materials only. | Each | $0.61 | 200 | $122.00 |
| One Species, Cool Season, Native Perennial Grass | 2312 | Native, cool season perennial grass. Includes material and shipping only. | Acre | $155.64 | 0.28 | $43.58 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $68.44 | 0.28 | $19.16 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 422 - Hedgerow Planting

**Scenario** #4 - Two or Three Row, Both Woody

**Scenario Description:**

Two or three rows of woody vegetation are planted in a linear design. Hedgerow is used on any land type where it is necessary to address one or more of the following resource concerns: Inadequate Habitat for Fish and Wildlife, reduce emissions of particulate matter; reduce objectionable odors; soil erosion; soil quality degradation. Two rows of shrubs / woody species are planted based on State Technical guidance. Some non-competitive tall herbaceous vegetation may also be included. Average height of hedgerow will be at least 3 feet and will extend 25-30 feet wide at maturity.

**Before Situation:**

One or more of the following resource concerns are identified on the site: soil is lost to sheet and rill erosion; sediments are deposited into surface waters; there is lack of wildlife or pollinator habitat; air or soil quality issues are present.

**After Situation:**

A hedgerow is installed in a design that will resolve the identified resource concerns.

**Feature Measure:** Length of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $7,613.17

**Scenario Cost/Unit:** $9.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 32 | $684.48 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1.5 | $16.41 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.5 | $6.19 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 60 | $741.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 120 | $3,408.00 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.48 | 300 | $1,344.00 |
| Tree shelter, solid tube type, 4" x 36" | 1565 | 4" x 36" tree tube for protection from animal damage. Materials only. | Each | $3.28 | 300 | $984.00 |
| Stakes, wood, 1" x 1" x 36" | 1577 | 1" x 1" x 36" wood stakes to fasten items in place. Includes materials only. | Each | $0.61 | 300 | $183.00 |
| One Species, Cool Season, Native Perennial Grass | 2312 | Native, cool season perennial grass. Includes material and shipping only. | Acre | $155.64 | 0.5 | $77.82 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 422 - Hedgerow Planting

**Scenario** #7 - Three Rows for Pollinators, Two Herbaceous

**Scenario Description:**

A three-row hedgerow is installed with one middle row as woody vegetation (tree/shrub) with herbaceous/forbs for pollinators planted along each side. This scenario can be implemented in areas where pollinator habitat is a wildlife habitat concern. Optimal conditions for pollinators requires planting different flowering plants, shrubs or forbs so that there are species in bloom early-season (late Winter-Spring), mid-season (Spring- early Summer), and late-season (Summer-Fall). Typically a mixture of 5 or more species is planted to improve diversity so that pollen and nectar are available as long as possible, ensuring bloomage at all times. Tillage is used to prepare the site for planting. Follow specific State guidance for planting specifications and rates. Flowering trees and shrubs adapted for local climatic and edaphic conditions are planted as the center row with strips of forbs on both sides. Additional resource concerns addressed: reduce emissions of particulate matter; reduce objectionable odors; soil erosion; soil quality degradation.

**Before Situation:**

Pollen and nectar sources are lacking or are only available for part of the growing season. Large cropland tracts lack undisturbed areas for ground nesting bees.

**After Situation:**

Flowering plants supply pollen and nectar throughout the growing season. Any undisturbed areas provide nesting sites for bees and other native pollinators.

**Feature Measure:** Length of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $5,274.31

**Scenario Cost/Unit:** $6.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 24 | $513.36 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 0.75 | $8.21 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.25 | $3.09 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 40 | $494.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.48 | 200 | $896.00 |
| Tree shelter, solid tube type, 4" x 36" | 1565 | 4" x 36" tree tube for protection from animal damage. Materials only. | Each | $3.28 | 200 | $656.00 |
| Stakes, wood, 1" x 1" x 36" | 1577 | 1" x 1" x 36" wood stakes to fasten items in place. Includes materials only. | Each | $0.61 | 200 | $122.00 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $566.31 | 0.25 | $141.58 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 428 - Irrigation Ditch Lining

**Scenario** #1 - Concrete Lining

**Scenario Description:**

Construct quarter mile of concrete (2.5 inch in thickness) lining in an existing ditch alignment to convey water from the source of supply to a field or fields in a farm distribution system. Typical scenario includes filling the old ditch with on-site fill material, compacting, and constructing an 8 ft pad with on site fill material. This scenario does not include any check or outlets gates. A trapezoidal trencher forms the ditch (typical cross-section: 1 ft bottom, 2 ft depth including freeboard, and 1:1 side slope) and lining with concrete slip forms (total width = 7.32 ft). Resource Concerns: Insufficient water - Inefficient use of irrigation water; Soil erosion - Excessive bank erosion from streams shorelines or channels. Associated Practices: 320-Irrigation Canal or Lateral; 388-Irrigation Field Ditch; 443-Irrigation System, Surface or Subsurface Water; 533-Pumping Plant; 430-Irrigation Pipeline; 587-Structure for Water Control.

**Before Situation:**

Leaky and erosive earthen irrigation ditch.

**After Situation:**

Impervious lining prevents seepage, reduces energy use and improves water quality and irrigation efficiency.

**Feature Measure:** Surface Area of Lining

**Scenario Unit::** Square Yard

**Scenario Typical Size:** 1,074.0

**Scenario Total Cost:** $15,649.83

**Scenario Cost/Unit:** $14.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formless, non reinforced | 36 | Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $138.47 | 75 | $10,385.25 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 368 | $850.08 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 782 | $3,417.34 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |

**Practice:** 428 - Irrigation Ditch Lining

**Scenario** #2 - Flexible Lining

**Scenario Description:**

Construct quarter mile of uncovered flexible membrane (30mil HDPE) lining in an existing ditch alignment to convey water from the source of supply to a field or fields in a farm distribution system. Typical scenario includes subgrade preparation via clearing & grubbing, shaping old channel with no bedding or geotextile cushion to place, and placing membrane with 8 inch tuck/anchor on each side (total liner width = 8 ft). Scenario assumes typical trapezoidal ditch (1 ft bottom, 2 ft depth including freeboard, and 1:1 side slope). Resource Concerns: Insufficient water - Inefficient use of irrigation water; Soil erosion - Excessive bank erosion from streams shorelines or channels. Associated Practices: 320-Irrigation Canal or Lateral; 388-Irrigation Field Ditch; 443-Irrigation System, Surface or Subsurface Water; 533-Pumping Plant; 430-Irrigation Pipeline; 587-Structure for Water Control.

**Before Situation:**

Leaky and erosive earthen irrigation ditch.

**After Situation:**

Impervious lining prevents seepage, reduces energy use and improves water quality and irrigation efficiency.

**Feature Measure:** Surface Area of Lining

**Scenario Unit::** Square Yard

**Scenario Typical Size:** 1,173.0

**Scenario Total Cost:** $12,096.98

**Scenario Cost/Unit:** $10.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 16 | $880.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 48 | $2,268.00 |
| **Materials** | | | | | | |
| Synthetic Liner, 30 mil | 1238 | Synthetic 30 mil HDPE, LLDPE, EPDM, etc. membrane liner material. Includes materials and shipping only. | Square Foot | $0.63 | 10560 | $6,652.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #1 - PVC <4 inch, Typical Install

**Scenario Description:**

Description: Below ground installation of PVC pipeline with a diameter of <4". Scenario covers the trenching in normal soils, placement of pipe with a diameter of 4" or less, all fittings, thrust blocks and appurtenances and backfill & final grading of the trench. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is to construct 1/4 mile (1,320 feet) of 3", Class 160, PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 1,320 feet of 3", Class 160 PVC gasketed IPS pipe weighs 0.96 lb/ft, or a total of 1,267 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 1,395. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 1,267.0

**Scenario Total Cost:** $6,006.53

**Scenario Cost/Unit:** $4.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 1320 | $1,795.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 1395 | $2,803.95 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 430 - Irrigation Pipeline

**Scenario** #2 - PVC <4 inch, Difficult Install

**Scenario Description:**

Description: Below ground installation of PVC pipeline with a diameter of <4" in rocky soils. Scenario covers the trenching in rocky soils, placement of pipe with a diameter of 4" or less, all fittings, thrust blocks and appurtenances and backfill & final grading of the trench. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is to construct 1/4 mile (1,320 feet) of 3", Class 160, PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. Site has rocky soils requiring rock ripping for the excavation and import of 25% of the fill needed for backfill of the trench. The unit is weight of pipe material in pounds. 1,320 feet of 3", Class 160 PVC gasketed IPS pipe weighs 0.96 lb/ft, or a total of 1,267 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 1,395. Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 1,267.0

**Scenario Total Cost:** $9,611.91

**Scenario Cost/Unit:** $7.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 395 | $1,935.50 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 395 | $963.80 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 100 | $164.00 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 200 | $64.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 45 | $1,278.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 50 | $1,405.50 |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 1395 | $2,803.95 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #3 - PVC 4-12 inch, Typical Install

**Scenario Description:**

Description: Below ground installation of PVC pipeline with a diameter between 4" and 12". Scenario covers the trenching in normal soils, placement of pipe with a diameter of 4" to 12", all fittings, thrust blocks and appurtenances and backfill & final grading of the trench. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is to construct 1/4 mile (1,320 feet) of 6", Class 160, PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 1,320 feet of 6", Class 160 PVC gasketed IPS pipe weighs 3.4 lb/ft, or a total of 4,488 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 4937. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 4,488.0

**Scenario Total Cost:** $13,125.95

**Scenario Cost/Unit:** $2.92

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 1320 | $1,795.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 4937 | $9,923.37 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 430 - Irrigation Pipeline

**Scenario** #4 - PVC 4 -12 inch, Difficult Install

**Scenario Description:**

Description: Below ground installation of PVC pipeline with a diameter between 4" and 12" in rocky soils. Scenario covers the trenching in rocky soils, placement of pipe with a diameter of 4" to 12", all fittings, thrust blocks and appurtenances and backfill & final grading of the trench. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is to construct 1/4 mile (1,320 feet) of 6", Class 160, PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. Site has rocky soils requiring rock ripping for the excavation and import of 25% of the fill needed for backfill of the trench. The unit is weight of pipe material in pounds. 1,320 feet of 6", Class 160 PVC gasketed IPS pipe weighs 3.4 lb/ft, or a total of 4,488 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 4937. Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 4,488.0

**Scenario Total Cost:** $16,731.33

**Scenario Cost/Unit:** $3.73

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 395 | $1,935.50 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 395 | $963.80 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 100 | $164.00 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 200 | $64.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 45 | $1,278.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 50 | $1,405.50 |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 4937 | $9,923.37 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #5 - PVC >12 inch, Typical Install

**Scenario Description:**

Description: Below ground installation of PVC pipeline with a diameter greater than 12". Scenario covers the trenching in normal soils, placement of pipe with a diameter greater than 12", all fittings, thrust blocks and appurtenances and backfill & final grading of the trench. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is to construct 1/4 mile (1,320 feet) of 15", Class 125, PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 1,320 feet of 15", Class 125 PVC gasketed PIP pipe weighs 14.92 lb/ft, or a total of 19,694 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 21,664 lbs. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 19,694.0

**Scenario Total Cost:** $49,057.22

**Scenario Cost/Unit:** $2.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $3.11 | 1320 | $4,105.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 21664 | $43,544.64 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #6 - PVC >12 inch, Difficult Install

**Scenario Description:**

Description: Below ground installation of PVC pipeline with a diameter greater than 12" in rocky soils. Scenario covers the trenching in normal soils, placement of pipe with a diameter of greater than 12", all fittings, thrust blocks and appurtenances and backfill & final grading of the trench. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is to construct 1/4 mile (1,320 feet) of 15", Class 160, PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. Site has rocky soils requiring rock ripping for the excavation and import of 25% of the fill needed for backfill of the trench. The unit is weight of pipe material in pounds. 1,320 feet of 15", Class 125 PVC gasketed PIP pipe weighs 14.92 lb/ft, or a total of 19,694 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 21,664 lbs. Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 19,694.0

**Scenario Total Cost:** $52,780.60

**Scenario Cost/Unit:** $2.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 880 | $4,312.00 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 880 | $2,147.20 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 220 | $360.80 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 440 | $140.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 45 | $1,278.00 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 21664 | $43,544.64 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #7 - HDPE <4 inch

**Scenario Description:**

Description: Below ground installation of HDPE pipeline with a diameter of less than 4". HDPE is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use Typical scenario size is 3-inch. Construct 1/4 mile (1,320 feet) of 3-inch, Class 160 HDPE pipeline with appurtenances, installed below ground with a minimum 2 feet of ground cover. The unit is weight of pipe material in pounds. 1,320 feet of 3-inch, Class 130 (SDR-13.5), HDPE weighs 1.36 lb/ft, or a total of 1,795 pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 1,975. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 1,795.0

**Scenario Total Cost:** $8,293.64

**Scenario Cost/Unit:** $4.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 1320 | $1,795.20 |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 16 | $390.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 1975 | $4,700.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #8 - HDPE <4 inch, Difficult Install

**Scenario Description:**

Description: Below ground installation of HDPE pipeline with a diameter of less than 4" installed in rocky soils. HDPE is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use Typical scenario size is 3-inch. Construct 1/4 mile (1,320 feet) of 3-inch, Class 160 HDPE pipeline with appurtenances, installed below ground with a minimum 2 feet of ground cover. Site has rocky soils requiring rock ripping for the excavation and import of 25% of the fill needed for backfill of the trench. The unit is weight of pipe material in pounds. 1,320 feet of 3-inch, Class 130 (SDR-13.5), HDPE weighs 1.36 lb/ft, or a total of 1,795 pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 1,975. Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 1,795.0

**Scenario Total Cost:** $10,471.50

**Scenario Cost/Unit:** $5.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 392 | $1,920.80 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 392 | $956.48 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 100 | $164.00 |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 16 | $390.56 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 200 | $64.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 45 | $1,278.00 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 1975 | $4,700.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #9 - HDPE 4-12 inch, Typical Install

**Scenario Description:**

Description: Below ground installation of HDPE pipeline with a diameter between 4" and 12". HDPE is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario size is 6-inch. Construct 1/4 mile (1,320 feet) of 6-inch, Class 160 HDPE pipeline with appurtenances, installed below ground with a minimum 2 feet of ground cover. The unit is weight of pipe material in pounds. 1,320 feet of 6-inch, Class 160, HDPE weighs 4.87 lb/ft, or a total of 6,432 pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weighed of 7,076 lbs. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 6,432.0

**Scenario Total Cost:** $20,434.02

**Scenario Cost/Unit:** $3.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 1320 | $1,795.20 |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 16 | $390.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 7076 | $16,840.88 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #10 - HDPE 4-12 inch, Difficult Install

**Scenario Description:**

Description: Below ground installation of HDPE pipeline with a diameter between 4" and 12" with installation in rocky soils. HDPE is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario size is 6-inch. Construct 1/4 mile (1,320 feet) of 6-inch, Class 160 HDPE pipeline with appurtenances, installed below ground with a minimum 2 feet of ground cover. Site has rocky soils requiring rock ripping for the excavation and import of 25% of the fill needed for backfill of the trench. The unit is weight of pipe material in pounds. 1,320 feet of 6-inch, Class 160, HDPE weighs 4.87 lb/ft, or a total of 6,432 pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weighed of 7,076 lbs. Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 6,432.0

**Scenario Total Cost:** $22,611.88

**Scenario Cost/Unit:** $3.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 392 | $1,920.80 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 392 | $956.48 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 100 | $164.00 |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 16 | $390.56 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 200 | $64.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 45 | $1,278.00 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 7076 | $16,840.88 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #11 - HDPE >12 inch, Typical Install

**Scenario Description:**

Description: Below ground installation of HDPE pipeline with a diameter greater 12". HDPE is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use Typical scenario size is 15-inch. Construct 1/4 mile (1,320 feet) of 15-inch, Clas160 (SDR11), HDPE pipeline with appurtenances, installed below ground with a minimum 2 feet of ground cover. The unit is weight of pipe material in pounds. 1,320 feet of 15-inch, Clas160 (SDR11), HDPE weighs 28.26 lb/ft for a total weight of 37,303 lbs. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 41,034 lbs. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 37,303.0

**Scenario Total Cost:** $101,254.06

**Scenario Cost/Unit:** $2.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 1320 | $1,795.20 |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 16 | $390.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 41034 | $97,660.92 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #12 - HDPE >12 inch, Difficult Install

**Scenario Description:**

Description: Below ground installation of HDPE pipeline with a diameter greater 12" in rocky soils. HDPE is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use Typical scenario size is 15-inch. Construct 1/4 mile (1,320 feet) of 15-inch, Class 130 (SDR-13.5), HDPE pipeline with appurtenances, installed below ground in rocky soils with a minimum 2 feet of ground cover. Site has rocky soils requiring rock ripping for the excavation and import of 25% of the fill needed for backfill of the trench. The unit is weight of pipe material in pounds. 1,320 feet of 15-inch, Class 130 (SDR-13.5), HDPE weighs 28.26 lb/ft for a total weight of 37,303 lbs. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 41,034 lbs. Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 37,303.0

**Scenario Total Cost:** $107,287.44

**Scenario Cost/Unit:** $2.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 880 | $4,312.00 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 880 | $2,147.20 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 220 | $360.80 |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 16 | $390.56 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 440 | $140.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 45 | $1,278.00 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 41034 | $97,660.92 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #13 - Surface HDPE <4 inch

**Scenario Description:**

Description: On-ground surface installation of HDPE (Iron Pipe Size & Tubing) pipeline with a diameter of less than 4". HDPE (IPS & Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. And typical scenario size is 3-inch. Construct 1/4 mile (1,320 feet) of 3-inch, Class 200 (SDR-9.0), HDPE pipeline with appurtenances, installed on the ground surface. The unit is weight of pipe material in pounds. 1,320 feet of 2-inch, Class 200 (SDR-9.0), HDPE weighs 1.615 lb/ft, or a total of 2132 pounds. Appurtenances include: fittings, air vents, pressure relief valves, anchors, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 15% of pipe material quantity) for a total weight of 2,452 lbs. Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 2,132.0

**Scenario Total Cost:** $6,623.12

**Scenario Cost/Unit:** $3.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 8 | $195.28 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 2452 | $5,835.76 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #14 - Surface HDPE 4-12 inch

**Scenario Description:**

Description: On-ground surface installation of HDPE (Iron Pipe Size & Tubing) pipeline with a diameter between 4" and 12". HDPE (IPS & Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. And typical scenario size is 10-inch. Construct 1/4 mile (1,320 feet) of 10-inch, Class 200 (SDR-9.0), HDPE pipeline with appurtenances, installed on the ground surface. The unit is weight of pipe material in pounds. 1,320 feet of 10-inch, Class 200 (SDR-9.0), HDPE weighs 15.22 lb/ft, or a total of 20,091 pounds. Appurtenances include: fittings, air vents, pressure relief valves, anchors, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 15% of pipe material quantity) for a total weight of 23,104. Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 20,091.0

**Scenario Total Cost:** $55,774.88

**Scenario Cost/Unit:** $2.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 8 | $195.28 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 23104 | $54,987.52 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #15 - Surface HDPE >12 inch

**Scenario Description:**

Description: On-ground surface installation of HDPE (Iron Pipe Size & Tubing) pipeline with a diameter greater than 12". HDPE (IPS & Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. And typical scenario size is 15-inch. Construct 1/4 mile (1,320 feet) of 16-inch, Class 200 (SDR-9.0), HDPE pipeline with appurtenances, installed on the ground surface. The unit is weight of pipe material in pounds. 1,320 feet of 16-inch, Class 200 (SDR-9.0), HDPE weighs 33.74 lb/ft, or a total of 44,537 pounds. Appurtenances include: fittings, air vents, pressure relief valves, anchors, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 15% of pipe material quantity) for a total weight of 51,217 lbs. Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 44,537.0

**Scenario Total Cost:** $122,683.82

**Scenario Cost/Unit:** $2.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 8 | $195.28 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 51217 | $121,896.46 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #16 - HDPE (Corrugated Plastic Pipe)

**Scenario Description:**

Description: Below ground installation of HDPE (Corrugated Plastic Pipe) pipeline. HDPE (CPP) Twin-Wall is manufactured in sizes (nominal diameter) from 4-inch to 60-inch; typical practice sizes range from 12-inch to 24-inch; and typical scenario size is 18-inch. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Construct 1/8 mile (660 feet) of 18-inch, Twin-Wall, HDPE Corrugated Plastic Pipe (CPP) with a smooth interior, and appurtenances, installed below ground with a minimum 2 feet of ground cover. The unit is in weight of pipe material in pounds. 660 feet of 18-inch, Twin-Wall, HDPE CPP weighs 6.40 lb/ft, or a total of 4,224 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 4646 pounds. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 4,224.0

**Scenario Total Cost:** $13,266.96

**Scenario Cost/Unit:** $3.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 30" x 48" | 1384 | Trenching, earth, 30" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $3.71 | 660 | $2,448.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 64 | $1,817.60 |
| **Materials** | | | | | | |
| Pipe, HDPE, corrugated single wall, <= 12" weight priced Compound | 1380 | High Density Polyethylene (HDPE) compound manufactured into single wall corrugated pipe or tubing. Materials only. | Pound | $1.83 | 4646 | $8,502.18 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #17 - Surface Steel (Iron Pipe Size)

**Scenario Description:**

Description: On-ground surface installation of Steel (Iron Pipe Size) pipeline. Steel (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 18-inch; and typical scenario size is 2-inch. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Construct 1/4 mile (1,320 feet) of 2-inch, Schedule 40, Galvanized Steel Pipe with appurtenances, installed on the ground surface. The unit is weight of pipe material in pounds. 1,320 feet of 2-inch, Schedule 40, Galvanized Steel Pipe weighs 3.653 lb/ft, or a total of 4,822 pounds . Appurtenances include: couplings, fittings, air vents, pressure relief valves, anchors, expansion joints, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 15% of pipe material quantity) for a total weight of 5545 pounds. Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 4,822.0

**Scenario Total Cost:** $10,623.35

**Scenario Cost/Unit:** $2.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| **Materials** | | | | | | |
| Pipe, steel, smooth wall, galvanized, weight priced | 1381 | Steel manufactured into galvanized smooth wall pipe | Pound | $1.67 | 5545 | $9,260.15 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #18 - Steel (Corrugated Steel Pipe)

**Scenario Description:**

Description: Below ground installation of Corrugated Steel Pipe (CSP) pipeline. Steel (CSP) is manufactured in sizes (nominal diameter) from 12-inch to 72-inch; typical practice sizes range from 12-inch to 24-inch; and typical scenario size is 18-inch. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Construct 1/8 mile (660 feet) of 18-inch, 14-gauge, Galvanized Corrugated Steel Pipe (CSP) with appurtenances, installed below ground with a minimum 2 feet of ground cover. The unit is weight of pipe material in pounds. 660 feet of 18-inch, 14-gauge, Galvanized CSP weighs 18.0 lb/ft, or a total of 11,800 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 11,880.0

**Scenario Total Cost:** $20,930.48

**Scenario Cost/Unit:** $1.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 30" x 48" | 1384 | Trenching, earth, 30" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $3.71 | 660 | $2,448.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| **Materials** | | | | | | |
| Pipe, CMP, 14-12 gauge, weight priced | 1589 | 14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.15 | 13662 | $15,711.30 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #19 - Surface Aluminum (Aluminum Irrigation Pipe)

**Scenario Description:**

Description: On-ground surface installation of Aluminum Irrigation Pipe (AIP) pipeline. AIP is manufactured in sizes (nominal diameter) from 2-inch to 12-inch; typical practice sizes range from 6-inch to 12-inch; and typical scenario size is 8-inch. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Construct 1/8 mile (660 feet) of 8-inch, 0.050-inch wall, Aluminum Irrigation Pipe (AIP) with appurtenances, installed on the ground surface. The unit is weight of pipe in pounds of pipe material. 660 feet of 8-inch, 0.050-inch wall, AIP weighs 1.47 lb/ft, or a total of 970 pounds. Appurtenances include: couplings, fittings, air vents, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 1,067 lbs. Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 970.0

**Scenario Total Cost:** $5,564.85

**Scenario Cost/Unit:** $5.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 25 | $710.00 |
| **Materials** | | | | | | |
| Pipe, aluminum, smooth wall, weight priced | 1382 | Aluminum manufactured into smooth wall pipe | Pound | $4.55 | 1067 | $4,854.85 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #22 - PVC, High fitting ratio

**Scenario Description:**

Description: Below ground installation of PVC pipeline with a large number of fittings, risers or valves. Scenario covers the trenching in normal soils, placement of pipe with a diameter of 4" to 12", all fittings, thrust blocks and appurtenances and backfill & final grading of the trench. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is to construct 1/4 mile (1,320 feet) of 6", Class 160, PVC pipeline with a higher than typical number of appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 1,320 feet of 6", Class 160 PVC gasketed IPS pipe weighs 3.4 lb/ft, or a total of 4,488 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 50% of pipe material quantity) for a total weight of 6,732 lbs. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 4,488.0

**Scenario Total Cost:** $17,245.10

**Scenario Cost/Unit:** $3.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 1320 | $1,795.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 50 | $1,420.00 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 6732 | $13,531.32 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #23 - Stream/road crossing directional drilling, 4-12 inch steel casing

**Scenario Description:**

Description: Below ground installation of pipeline requiring boring under a road or stream. Scenario covers excavation to place directional drill, drilling under road or stream and placement of 'sleeve pipe', placement of PVC pipe, all fittings, thrust blocks and appurtenances and backfill & final grading of the trench. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Fields on the far side of a stream or road are inaccessible for irrigation or an above ground pipeline or temporary pipeline is used to cross a stream or a temporary pipeline is placed through a road culvert to cross a road. Manure may leak during application at fittings, there is an increased risk of discharge to a stream or far fields are not accessible for application of irrigation water.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is for boring 100' under a road with an 8" steel casing pipe and a 6" inner PVC pipe. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Length of Boring

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $17,711.57

**Scenario Cost/Unit:** $177.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Horizontal Boring, Greater Than 3" diameter | 1132 | Includes equipment, labor and setup. | Foot | $83.63 | 100 | $8,363.00 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 60 | $146.40 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 60 | $98.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 410 | $824.10 |
| Pipe, steel, smooth wall, galvanized, weight priced | 1381 | Steel manufactured into galvanized smooth wall pipe | Pound | $1.67 | 4340 | $7,247.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #24 - Above Ground, Ultra UV Resistant PVC

**Scenario Description:**

Description: Above ground installation of an ultra UV resistant PVC pipeline. PVC pipe is constructed for above ground conditions with restrained joints, special materials that are UV resistant, and more impact resistant/harder than typical PVC pipe. Pipe lengths are connected using a gasketed system, and locking restraining ties. Pipe installations may be temporary or permanent, and can be removed at the end of the irrigation season. Scenario covers placement of pipe with a diameter of 2" to 12", all fittings, and appurtenances. Typical installation applies to special conditions such as very difficult soil/rock excavation conditions, environmental or cultural resource restraints that do not allow ground disturbance, road crossings, and temporary piping needs only for use during the irrigation season. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is to construct 1/4 mile (1,320 feet) of 6", Class 160, PVC pipeline with appurtenances, installed above ground. The unit is weight of pipe material in pounds. 1,320 feet of 6", Class 160 PVC gasketed IPS pipe weighs 3.6 lb/ft, or a total of 4,752 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity) for a total weight of 5228 lbs. Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 4,752.0

**Scenario Total Cost:** $14,254.76

**Scenario Cost/Unit:** $3.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 1320 | $1,795.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 60 | $1,704.00 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 5227 | $10,506.27 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #37 - Stream/road crossing directional drilling >12 inch

**Scenario Description:**

Description: Below ground installation of pipeline requiring boring under a road or stream. Scenario covers excavation to place directional drill, drilling under road or stream and placement of 'sleeve pipe', placement of PVC pipe, all fittings, thrust blocks and appurtenances and backfill &final grading of the trench. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface &Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Fields on the far side of a stream or road are inaccessible for irrigation or an above ground pipeline or temporary pipeline is used to cross a stream or a temporary pipeline is placed through a road culvert to cross a road. Manure may leak during application at fittings, there is an increased risk of discharge to a stream or far fields are not accessible for application of irrigation water.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is for boring 100' under a road with a 16" schedule 80 steel casing pipe and a 14" schedule 40 PVC inner pipe. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Length of directional drilling

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $34,563.97

**Scenario Cost/Unit:** $345.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Horizontal Boring, Greater Than 3" diameter | 1132 | Includes equipment, labor and setup. | Foot | $83.63 | 100 | $8,363.00 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 60 | $146.40 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 60 | $98.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 1300 | $2,613.00 |
| Pipe, steel, smooth wall, galvanized, weight priced | 1381 | Steel manufactured into galvanized smooth wall pipe | Pound | $1.67 | 13190 | $22,027.30 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #38 - Stream/road cross, directional drilling < 4 inch

**Scenario Description:**

Description: Below ground installation of pipeline requiring boring under a road or stream. Scenario covers excavation to place directional drill, drilling under road or stream and placement of 'sleeve pipe', placement of PVC pipe, all fittings, thrust blocks and appurtenances and backfill &final grading of the trench. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Micro-irrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface &Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Fields on the far side of a stream or road are inaccessible for irrigation or an above ground pipeline or temporary pipeline is used to cross a stream or a temporary pipeline is placed through a road culvert to cross a road. Manure may leak during application at fittings, there is an increased risk of discharge to a stream or far fields are not accessible for application of irrigation water.

**After Situation:**

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is for boring 100' under a road with a 3" schedule 40 steel casing pipe and a 1.5" schedule 40 PVC inner pipe. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Length of drilling

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $11,029.47

**Scenario Cost/Unit:** $110.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Horizontal Boring, Greater Than 3" diameter | 1132 | Includes equipment, labor and setup. | Foot | $83.63 | 100 | $8,363.00 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 60 | $146.40 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 60 | $98.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 60 | $120.60 |
| Pipe, steel, smooth wall, galvanized, weight priced | 1381 | Steel manufactured into galvanized smooth wall pipe | Pound | $1.67 | 760 | $1,269.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #1 - Embankment Dam

**Scenario Description:**

The reservoir, created by an embankment built across a natural depression, with an 18" diameter principal spillway outlet through the embankment, is controlled by a canal-style gate. Outlet can also serve as overflow protection with a 12" diameter standpipe and tee to the 18" pipe. Any watershed runoff will be diverted around reservoir. Typical size: Built with approximately 4,500 cubic yards of material; about 19.9 feet high and 200 feet long and hold approximately 1,000,000 gallons (3 acre-feet). The top of berm will be about 10 feet wide and the embankment side slopes will be 2.5 H to 1 V up and down stream. Resource concern: Insufficient Water - Inefficient use of irrigation water. Associated practices include: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 378 - Pond; 447 - Irrigation System, Tailwater Recovery; 484 - Mulching; and 342 - Critical Area Planting.

**Before Situation:**

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application. Divert water around - no spillway

**After Situation:**

This is an embankment, installed across a natural off-stream intermittent watercourse, used to store water for subsequent irrigation. It will be used to accumulate and store water for timely and efficient application of water through an irrigation system The water source could be a well, irrigation district pipeline, and/or a pump from a stream. It is designed to deliver water by gravity to an open ditch or non-pressurized pipeline, generally in excess of 5 cfs. All earthen materials will be from on-site sources.

**Feature Measure:** Volume of Compacted Eartfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 4,500.0

**Scenario Total Cost:** $24,640.68

**Scenario Cost/Unit:** $5.48

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 4500 | $19,665.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 12" | 1244 | Pipe, Corrugated HDPE Double Wall, 12" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $6.98 | 36 | $251.28 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 18" | 1245 | Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $13.16 | 120 | $1,579.20 |
| Screw gate, cast iron, 18" diameter, 10/0 head | 1917 | 18" diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only. | Each | $1,075.90 | 1 | $1,075.90 |
| Coupling, HDPE CPT Dual Wall, Tee, 18"x18"x12" | 1921 | Tee, 18"x18"x12" - HDPE CPT Tee. Materials only. | Each | $284.98 | 1 | $284.98 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #2 - Embankment Reservoir

**Scenario Description:**

This is a small rectangular embankment reservoir with a 10" diameter principal spillway through the embankment controlled by a canal-type gate. It is designed to accumulate, store, and deliver water by gravity to an open ditch or non-pressurized pipeline, in excess of 5 cfs. Typical size: Inside dimension of about 375 feet square, with 12 feet of fill and about 1600 feet total length of embankment (along the centerline). The embankment top is about 10 feet wide and the side slopes will no steeper than 2.5 H to 1 V inside and out. Built with approximately 28,500 cubic yards of on-site material. Maximum water depth of 10 feet with 2 feet of freeboard and no auxiliary spillway. Volume is approximately 30 ac-ft (10,000,000 gallons). Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

**Before Situation:**

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

**After Situation:**

The square reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream, an irrigation well, or an irrigation district canal.

**Feature Measure:** Volume of Compacted Earthfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 28,500.0

**Scenario Total Cost:** $125,700.20

**Scenario Cost/Unit:** $4.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 28500 | $124,545.00 |
| **Materials** | | | | | | |
| Catwalk, metal | 1918 | Metal pedestrian walk way giving access to the valve on a structure, typically 3' wide with railing. Materials only. | Foot | $57.76 | 20 | $1,155.20 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #3 - Excavated Tailwater Pit

**Scenario Description:**

This is an excavated pit with a control structure. It is designed to accumulate, store, deliver or regulate water for a surface irrigation system. Resource concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

**Before Situation:**

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

**After Situation:**

An excavated regulating reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream or an irrigation district canal. Typical sizing for this scenario calculations: A bottom width of 20 ft and length of 1,250 feet. The side slopes will be no steeper than 1.5 H to 1 V inside and out. Built with approximately 20,000 cubic yards of on-site material. Maximum water depth of 10 feet with 1 feet of freeboard. Volume is approximately 12 ac-ft (3,950,303 gallons).

**Feature Measure:** Volume of Earth Excavated

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 19,600.0

**Scenario Total Cost:** $45,276.00

**Scenario Cost/Unit:** $2.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 19600 | $45,276.00 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #1 - Vegetation Establishment

**Scenario Description:**

A micro-irrigation system, provide irrigation for upland wildlife habitat restoration sites, critical area planting sites and windrows. Drip tape, tubing or microsprayers may be used. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430-Irrigation Pipeline, 610-Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

An upland wildlife habitat site has insufficient water to support planted vegetation.

**After Situation:**

A surface placed microirrigation system is utilized to provide highly efficient irrigation to an upland wildlife site. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced. The typical system is a permanent system, installed on a 1 acre wildlife habitat site with above ground drip tubing. Total drip tubing installed is1,600 lf. This system typically includes a filter system, PE tubing laterals, PE (above ground) manifolds, and submains, valves, fittings, emitters, etc. Does not include Pump, Power source, Water source (well or reservoir).

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $610.59

**Scenario Cost/Unit:** $610.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Micro Irrigation, surface drip tubing | 1488 | Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in. | Foot | $0.35 | 1600 | $560.00 |
| Micro Irrigation, screen filter, < 100 gpm | 1617 | Screen filter for Micro Irrigation used in small systems. Includes filter. No controls are included or needed. | Each | $50.59 | 1 | $50.59 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #2 - Orchard-vineyard, 10ac or less

**Scenario Description:**

A micro-irrigation system to provide irrigation for orchards, vineyards and similar sites where irrigated area is 10 acres or less. Drip tape, tubing or microsprayers may be used. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430-Irrigation Pipeline, 610-Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

A vineyard has an inefficient surface flood irrigation system causing irrigation water loss that impacts water quality and water quantity.

**After Situation:**

A surface placed microirrigation system is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced. The typical system is a permanent system, installed on a 7 acre orchard on the ground surface. The orchard has a plant spacing of 15 feet x 20 feet. Laterals are spaced 20 feet apart. This system utilizes emitters at each tree or plant as the water application device. This system typically includes a filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include Pump, Power source, Water source (well or reservoir).

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 7.0

**Scenario Total Cost:** $18,610.70

**Scenario Cost/Unit:** $2,658.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Micro Irrigation, chemical injection equipment | 1987 | Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included. | Each | $1,508.81 | 1 | $1,508.81 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 456 | $916.56 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Micro Irrigation, disk filter | 1483 | Disk filter for Micro irrigation system. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $3,550.93 | 2 | $7,101.86 |
| Micro Irrigation, surface drip tubing | 1488 | Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in. | Foot | $0.35 | 15246 | $5,336.10 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #3 - Orchard-vineyard, >10ac

**Scenario Description:**

A micro-irrigation system to provide irrigation for orchards, vineyards and similar sites where irrigated area is greater than 10 acres. Drip tape, tubing or microsprayers may be used. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430-Irrigation Pipeline, 610-Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

A vineyard has an inefficient surface flood irrigation system causing irrigation water loss that impacts water quality and water quantity.

**After Situation:**

A surface placed microirrigation system is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced. The typical system is a permanent system, installed on a 40 acre orchard on the ground surface. The orchard has a plant spacing of 15 feet x 20 feet. Laterals are spaced 20 feet apart. This system utilizes emitters at each tree or plant as the water application device. This system typically includes a filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include Pump, Power source, Water source (well or reservoir).

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $60,028.28

**Scenario Cost/Unit:** $1,500.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Micro Irrigation, chemical injection equipment | 1987 | Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included. | Each | $1,508.81 | 1 | $1,508.81 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 3926 | $7,891.26 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Micro Irrigation, Media Filter, 30" to 48" Dia. tank, Equipped for Automatic Flush | 1482 | Sand or media filter for Micro irrigation system. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $5,347.77 | 3 | $16,043.31 |
| Micro Irrigation, screen filter, => 100 gpm | 1484 | Screen filter for Micro irrigation system with 100 gpm or greater capacity. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $345.53 | 1 | $345.53 |
| Micro Irrigation, surface drip tubing | 1488 | Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in. | Foot | $0.35 | 87120 | $30,492.00 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #4 - Orchard-vineyard, durable tubing replace

**Scenario Description:**

Replacement of orchard or vineyard micro-irrigation system components that have exceeded 15 years of service OR that do not meet current 441 practice standard criteria. Replace above ground durable tubing, emitters or sprayers with new durable tubing, emitters or sprayers. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430-Irrigation Pipeline, 610-Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

An existing micro-irrigation system includes deteriorated or outdated components resulting in substandard uniformity and/or inadequate irrigation control.

**After Situation:**

The repaired/upgraded microirrigation system provides more control of water applications. Typical upgrade includes replacement of durable lateral tubing. Offsite water quality is improved, and on site water use may be reduced.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $30,492.00

**Scenario Cost/Unit:** $762.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Micro Irrigation, surface drip tubing | 1488 | Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in. | Foot | $0.35 | 87120 | $30,492.00 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #5 - Small Acreage

**Scenario Description:**

A micro-irrigation system to provide irrigation for smaller acreages such as nurseries, hoop houses, and greenhouses. Drip tape, tubing or microsprayers may be used. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430-Irrigation Pipeline, 610-Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

A small cropland site is irrigated with an inefficient system resulting in excessive water use and decreased plant health and vigor.

**After Situation:**

A surface placed microirrigation system is utilized to provide highly efficient irrigation to the site. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced. The typical system is a permanent system, installed on a 2 acre row crop site. System includes 2" PVC manifold with above ground drip tubing. Row spacing is 6' With a total of 300' of width planted (accounting for additional access pathways needed for harvesting, etc.) for a total length of tubing of 10,000 ft or tubing. This system typically includes a filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. Does not include Mainline, Pump, Power source, Water source (well or reservoir).

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $9,220.77

**Scenario Cost/Unit:** $4,610.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Micro Irrigation, chemical injection equipment | 1987 | Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included. | Each | $1,508.81 | 1 | $1,508.81 |
| **Materials** | | | | | | |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.38 | 300 | $414.00 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Micro Irrigation, surface drip tubing | 1488 | Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in. | Foot | $0.35 | 10000 | $3,500.00 |
| Micro Irrigation, screen filter, < 100 gpm | 1617 | Screen filter for Micro Irrigation used in small systems. Includes filter. No controls are included or needed. | Each | $50.59 | 1 | $50.59 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #6 - Row Crop, Buried Manifold

**Scenario Description:**

A micro-irrigation system, provide irrigation for row crop fields utilizing buried manifold line. Drip tape, tubing or microsprayers may be used. System valves are automated. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430-Irrigation Pipeline, 610-Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

A small cropland site is irrigated with an inefficient system resulting in excessive water use and decreased plant health and vigor.

**After Situation:**

A microirrigation system is utilized to provide highly efficient irrigation to the site. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced. The typical system is a permanent system, installed on a 20 acre row crop site. System includes 3" PVC manifold with above ground drip tubing. Row spacing is 5' for a total length of tubing of 174240 ft. This system typically includes a filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. Does not include Mainline, Pump, Power source, Water source (well or reservoir).

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $82,228.85

**Scenario Cost/Unit:** $4,111.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Micro Irrigation, chemical injection equipment | 1987 | Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included. | Each | $1,508.81 | 1 | $1,508.81 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 1958 | $3,935.58 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Micro Irrigation, Media Filter, 30" to 48" Dia. tank, Equipped for Automatic Flush | 1482 | Sand or media filter for Micro irrigation system. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $5,347.77 | 2 | $10,695.54 |
| Micro Irrigation, control valves and timers | 1485 | Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled. | Each | $1,357.55 | 1 | $1,357.55 |
| Micro Irrigation, surface drip tubing | 1488 | Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in. | Foot | $0.35 | 174240 | $60,984.00 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #7 - Row Crop, Above Ground PE Manifold

**Scenario Description:**

A micro-irrigation system, provide irrigation for row crop fields utilizing above ground PE or "lay flat" manifold line. Drip tape, tubing or microsprayers may be used. System is not automated. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430-Irrigation Pipeline, 610-Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

A small cropland site is irrigated with an inefficient system resulting in excessive water use and decreased plant health and vigor.

**After Situation:**

A microirrigation system is utilized to provide highly efficient irrigation to the site. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced. The typical system is a permanent system, installed on a 20 acre row crop site. System includes above ground PE manifold with above ground drip tubing. Row spacing is 5' for a total length of tubing of 174240 ft. This system typically includes a filter system, PE tubing laterals, PE or "lay flat" manifolds, and submains, valves, fittings, emitters, etc. Does not include Mainline, Pump, Power source, Water source (well or reservoir).

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $73,342.04

**Scenario Cost/Unit:** $3,667.10

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Micro Irrigation, chemical injection equipment | 1987 | Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included. | Each | $1,508.81 | 1 | $1,508.81 |
| **Materials** | | | | | | |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Micro Irrigation, disk filter | 1483 | Disk filter for Micro irrigation system. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $3,550.93 | 2 | $7,101.86 |
| Micro Irrigation, surface drip tubing | 1488 | Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in. | Foot | $0.35 | 174240 | $60,984.00 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #8 - Retrofit, Irrigation Automation

**Scenario Description:**

The typical scenario consists of retrofitting an existing, functional pump and 40 acre micro irrigation system, but applies to systems larger or smaller than 40 acres as well. The existing system may be pressurized by a pump, or by gravity elevation drop. The retrofit includes the addition of electronic/computer based automatic control systems. Typical components may include any of the following: Soil moisture sensors, air and soil temperature sensors, weather station data collector, wireless communication base station, pump automation electronic controller, valve automation electronic controller, web or cellular phone based software interlink.

**Before Situation:**

The before practice situation is characterized by manual operation of an existing, functional, irrigation system based on non scientific estimates of soil moisture levels and air temperature. Irrigation, frost control, and cooling operations are based on conservative estimates by the land owner, resulting in overwatering of the crop and running pumping systems longer than necessary. The operator typically drives a vehicle a considerable distance to turn the pump station on and off. The current operation of the system results in significant energy and water waste.

**After Situation:**

The after practice situation is characterized by operation of the retrofitted irrigation system on 40 acres for irrigation, frost control, and cooling only when necessary based on soil moisture and air temperature measurements. Off-site operation of the pumping system reduces vehicle energy use. Significant energy and water conservation is achieved through scientific based irrigation system/pumping plant management/automation. Associated practices/activities may include: Irrigation Water Management (449), Pump Station (533) and 374-Farmstead Energy Improvement. The resource concern is inefficient use of water and energy during farm operations, which increases water use and dependence on non-renewable energy sources. These concerns are addressed through irrigation system automation.

**Feature Measure:** Per System

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $15,212.22

**Scenario Cost/Unit:** $15,212.22

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Switches and Controls, temp sensors | 1192 | Temperature and soil moisture sensors installed as part of an electronic monitoring (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $666.86 | 16 | $10,669.76 |
| Switches and Controls, programmable controller | 1193 | Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $170.29 | 1 | $170.29 |
| Switches and Controls, Wi-Fi system and software | 1194 | Software with built-in cellular or Wi-Fi communication commonly used to control pumps and irrigation systems | Each | $457.13 | 1 | $457.13 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #13 - SDI (Subsurface Drip Irrigation)

**Scenario Description:**

A subsurface drip irrigation system (SDI) with a lateral spacing between 37-59 inches. This buried drip irrigation system utilizes a thinwall dripperline or tape with inline emitters at a uniform spacing for the system laterals. The dripperline or tape is normally installed by being plowed in approx. 10-14 inches deep with a chisel shank type plow equipped with tape reels. This type of drip irrigation system utilizes a buried supply manifold with automated zone control valves and a buried flush manifold with manual flush valves. This permanent micro-irrigation system includes an automated filter station, flow meter, backflow prevention device, automated control box or timer, the thinwall dipperline or tape for laterals, both a supply and a flushing manifold and numerous types of water control valves. This is an all-inclusive system starting with the filter station including all required system components out to the flush valves. The water supply line from the water source to the filter station is an irrigation pipeline (430) and is not included as part of this system Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 433 - Irrigation Flow Measurement, 610 - Salinity & Sodic Soil Management, 434 - Soil Moisture Measurement, 328-Conservation Crop Rotation, and 590 Nutrient Management.

**Before Situation:**

Typical before irrigation situation would normally be an existing inefficient surface or sprinkler irrigation system on a cropland or hayland field. The existing irrigation system would experience poor, non-uniform irrigation applications and significant water losses affecting both water quantity and water quality

**After Situation:**

A typical practice would be the installation of a subsurface drip irrigation system (SDI) on a 60 acre cropland or hayland field. The system lateral (thinwall dripperline or tape) spacing would 40 inches. This highly efficient SDI (buried) irrigation system provides irrigation water directly to the plant root zone eliminating application losses resulting in a very high water application efficiency and properly designed these SDI systems are capable of very uniform water applications. Typical field size is 60 acres.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 60.0

**Scenario Total Cost:** $122,269.30

**Scenario Cost/Unit:** $2,037.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 6800 | $9,248.00 |
| Micro Irrigation, chemical injection equipment | 1987 | Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included. | Each | $1,508.81 | 1 | $1,508.81 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 4800 | $9,648.00 |
| Micro Irrigation, Media Filter, 30" to 48" Dia. tank, Equipped for Automatic Flush | 1482 | Sand or media filter for Micro irrigation system. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $5,347.77 | 3 | $16,043.31 |
| Micro Irrigation, screen filter, => 100 gpm | 1484 | Screen filter for Micro irrigation system with 100 gpm or greater capacity. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $345.53 | 1 | $345.53 |
| Micro Irrigation, control valves and timers | 1485 | Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled. | Each | $1,357.55 | 1 | $1,357.55 |
| Micro Irrigation, buried drip tape | 2521 | Tape that is installed underground for sub-surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tape is a minimum of 10 mil thick thick and has emitters built in. Includes labor and installtion. | Foot | $0.10 | 824108 | $82,410.80 |
| Water Meter, Microirrigation, >2" and <= 8", with Volume Totalizer | 2523 | Microirrigation water meter greater than 2" and less than or equal to 8 inch diameter, with volume totalizer. Includes materials only. | Each | $1,458.01 | 1 | $1,458.01 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #19 - Orchard-vineyard, >10ac with automation

**Scenario Description:**

A micro-irrigation system to provide irrigation for orchards, vineyards and similar sites where irrigated area is greater than 10 acres. Drip tape, tubing or micro-sprayers may be used. Automation retrofit includes the addition of electronic/computer based automatic control systems. Typical components may include any of the following: Soil moisture sensors, air and soil temperature sensors, weather station data collector, wireless communication base station, pump automation electronic controller, valve automation electronic controller, web or cellular phone based software interlink. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430-Irrigation Pipeline, 610-Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

A vineyard has an inefficient irrigation system causing irrigation water loss that impacts water quality and water quantity.

**After Situation:**

A surface placed micro-irrigation system is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced. The typical system is a permanent system, installed on a 40 acre orchard on the ground surface. The orchard has a plant spacing of 15 feet x 20 feet. Laterals are spaced at 20 feet. This system utilizes emitters at each tree or plant as the water application device. This system typically includes a filter system, PE tubing laterals, PVC manifolds, and sub-mains, remotely actuated valves, fittings, emitters, sensors, controllers, data transfer equipment, etc. This practice applies to systems designed to discharge < 60 gal/hour at each individual lateral discharge point. Does not include Pump, Power source, Water source (well or reservoir).

**Feature Measure:** Acres in Irrigation System

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $72,094.97

**Scenario Cost/Unit:** $1,802.37

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 3926 | $7,891.26 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Micro Irrigation, Media Filter, 30" to 48" Dia. tank, Equipped for Automatic Flush | 1482 | Sand or media filter for Micro irrigation system. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $5,347.77 | 3 | $16,043.31 |
| Micro Irrigation, screen filter, => 100 gpm | 1484 | Screen filter for Micro irrigation system with 100 gpm or greater capacity. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $345.53 | 1 | $345.53 |
| Micro Irrigation, control valves and timers | 1485 | Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled. | Each | $1,357.55 | 10 | $13,575.50 |
| Micro Irrigation, surface drip tubing | 1488 | Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in. | Foot | $0.35 | 87120 | $30,492.00 |

**Practice:** 442 - Sprinkler System

**Scenario** #1 - Center Pivot, < 600 Ft

**Scenario Description:**

Installation of a low pressure center pivot system less than 600' in length. System installation includes a flowmeter. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications). Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

A 160 acre field is flood irrigated. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.

**After Situation:**

The existing surface irrigation system is converted to a low pressure center pivot. Corners are converted to non-irrigated cropland. The pivot is 500 feet in length with pressure regulators and low pressure sprinklers on drops. The new irrigation system has a coefficient of uniformity above 85%. Irrigation water is efficiently and uniformly applied to maintain adequate soil water for the desired level of plant growth. Deep percolation and field runoff is eliminated and there are no excess nutrients, salts or pathogens delivered to the receiving waters. Irrigation induced runoff is eliminated. This center pivot scenario includes all hardware from the pivot point, including the concrete pad the pivot is placed on.

**Feature Measure:** Length of Center Pivot Lateral

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $47,183.22

**Scenario Cost/Unit:** $94.37

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Center pivot system with appurtenances, fixed cost portion | 317 | Fixed cost portion of the center pivot system with appurtenances. This portion includes the following items: pivot point, pipe, towers, pad, controls, sprinklers, installation. | Each | $6,609.59 | 1 | $6,609.59 |
| Irrigation, Center pivot system with appurtenances, variable cost portion | 318 | Variable cost portion of the center pivot system with appurtenances. This portion includes the following items: pivot point, pipe, towers, pad, controls, sprinklers, installation. | Foot | $72.38 | 500 | $36,190.00 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 442 - Sprinkler System

**Scenario** #2 - Center Pivot, > 600 Ft

**Scenario Description:**

Installation of a low pressure center pivot system greater than 600' in length. System installation includes a flowmeter. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications). Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

A 160 acre field is flood irrigated. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.

**After Situation:**

The existing surface irrigation system is converted to a low pressure center pivot. Corners are converted to non-irrigated cropland. The pivot is 1300 feet in length with pressure regulators and low pressure sprinklers on drops. The new irrigation system has a coefficient of uniformity above 85%. Irrigation water is efficiently and uniformly applied to maintain adequate soil water for the desired level of plant growth. Deep percolation and field runoff is eliminated and there are no excess nutrients, salts or pathogens delivered to the receiving waters. Irrigation induced runoff is eliminated. This center pivot scenario includes all hardware from the pivot point, including the concrete pad the pivot is placed on.

**Feature Measure:** Length of Center Pivot Lateral

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,300.0

**Scenario Total Cost:** $105,087.22

**Scenario Cost/Unit:** $80.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Center pivot system with appurtenances, fixed cost portion | 317 | Fixed cost portion of the center pivot system with appurtenances. This portion includes the following items: pivot point, pipe, towers, pad, controls, sprinklers, installation. | Each | $6,609.59 | 1 | $6,609.59 |
| Irrigation, Center pivot system with appurtenances, variable cost portion | 318 | Variable cost portion of the center pivot system with appurtenances. This portion includes the following items: pivot point, pipe, towers, pad, controls, sprinklers, installation. | Foot | $72.38 | 1300 | $94,094.00 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 442 - Sprinkler System

**Scenario** #3 - Linear Move System

**Scenario Description:**

Installation of a linear or lateral move sprinkler system with sprinklers on drops with or without drag hoses to improve irrigation efficiency and reduce soil erosion. System installation includes a flowmeter. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449) Payment rate is figured per foot of installed hardware length.

**Before Situation:**

A 76 acre field is flood irrigated. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.

**After Situation:**

A typical unit is approximately 76 acres in size with the sprinkler system up to 1280 feet in length with drop tubes that have a minimum of 30" spacing. The new irrigation system has a coefficient of uniformity above 85%. Irrigation water is efficiently and uniformly applied to maintain adequate soil water for the desired level of plant growth. Deep percolation and field runoff is eliminated and there are no excess nutrients, salts or pathogens delivered to the receiving waters. Irrigation induced runoff is eliminated.

**Feature Measure:** Length of Linear Move Lateral

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,280.0

**Scenario Total Cost:** $133,889.91

**Scenario Cost/Unit:** $104.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Linear Move System with appurtenances | 322 | Linear/lateral move system including: central tower, lateral towers, pipes, sprinklers, controllers, installation. | Acre | $1,704.03 | 76 | $129,506.28 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 442 - Sprinkler System

**Scenario** #4 - Wheel Line System

**Scenario Description:**

A 1,280 foot wheel line (also called side roll, wheel move, or lateral-roll) with 7 foot diameter wheels and five inch diameter supply pipeline. A wheel line consists of the mover, lateral pipe, wheels, sprinklers, couplers, and connectors to the mainline supply. System installation includes a flowmeter. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

Cropland that is flood irrigated and has poor irrigation efficiency and distribution uniformity. The slope and irregular shape of the field limit the potential for improved management to improve the irrigation efficiency or the distribution uniformity. Irrigation water moves both within the field and off it, resulting in wet areas, runoff and deep percolation. Parts of the field are over-irrigated, and other sections are under-irrigated. Runoff from the field flows into streams, water courses, and other water bodies. Excess applied irrigation water infiltrates into ground water causing degradation to the receiving waters.

**After Situation:**

A 1,280 foot wheel line with 7 foot diameter wheels and five inch diameter supply pipeline. Sprinklers are spaced along the wheel line at 40-foot intervals and risers are spaced at 60-foot increments along the mainline. The wheel line irrigates 40 acres of cropland. The wheel line improves distribution uniformity. Irrigation application efficiency improves to 75%. Water application rates meet the consumptive use of the crop and matches soil intake rates in order to prevent irrigation induced erosion, runoff, and deep percolation.

**Feature Measure:** Length of Wheel Line Lateral

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,280.0

**Scenario Total Cost:** $26,200.74

**Scenario Cost/Unit:** $20.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Wheel line with appurtenances, fixed price portion. | 325 | Fixed cost portion of the wheel line system with appurtenances. This portion includes the following items: mover, pipe, sprinklers, wheels, installation. | Each | $4,479.63 | 1 | $4,479.63 |
| Irrigation, Wheel line with appurtenances, variable price portion. | 326 | Variable cost portion of the wheel line system with appurtenances. This portion includes the following items: pipe, sprinklers, wheels, installation. Does not include a mover. | Foot | $13.78 | 1280 | $17,638.40 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 442 - Sprinkler System

**Scenario** #5 - Solid Set System

**Scenario Description:**

A solid set irrigation system. System installation includes a flowmeter. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

The typical installation will be on cropland with some existing inefficient irrigation. The farm is typically producing specialty crops, such as fresh vegetables.

**After Situation:**

The system is installed on 10 acres. The installed solid set system has 3-4 inch pipe sizes and sprinklers set 30 - 50 ft apart. Improved distribution uniformity and irrigation efficiency will result.

**Feature Measure:** Area of Irrigation System

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $53,051.75

**Scenario Cost/Unit:** $5,305.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Solid Set, w/Appurtenances | 324 | Solid Set irrigation system that includes pipe, sprinklers, connections, installation and appurtenances. | Acre | $4,916.67 | 10 | $49,166.70 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |

**Practice:** 442 - Sprinkler System

**Scenario** #6 - Solid Set System Renovation

**Scenario Description:**

Replacement of solid set system components that help improve system efficiency of an existing system to meet current 442 practice standard criteria. Items typically replaced or added include pressure regulators, heads, filters, injection equipment and control valves and a flowmeter. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

The typical installation will be on cropland with some existing inefficient irrigation. The farm is typically producing specialty crops, such as fresh vegetables. Existing system is more than 15 yrs. old and not functioning as planned due to worn nozzles and other leaks that contribute to irrigation inefficiency.

**After Situation:**

The repaired/upgraded sprinkler system provides more control of water applications. Offsite water quality is improved, and on site water use may be reduced. The typical retrofit is performed on a 5 acre field.

**Feature Measure:** Area of Irrigation System

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $4,088.17

**Scenario Cost/Unit:** $817.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| **Materials** | | | | | | |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |

**Practice:** 442 - Sprinkler System

**Scenario** #7 - Handline system

**Scenario Description:**

A handline irrigation system. System installation includes a flowmeter. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

The typical installation will be on cropland with some existing inefficient irrigation. The farm is typically producing specialty crops, such as fresh vegetables.

**After Situation:**

Typical installation of 1,280 foot handline. This will be moved to along a pipeline with risers spaced 30-60 feet apart according to a design. Mainline and risers have previously been installed or are being installed with associated Practice 430-Irrigation Pipeline. The handline is typically used to irrigate up to 20 acres. The handline improves distribution uniformity. Irrigation application efficiency improves to 75% with proper management. Water application rates meet the consumptive use of the crop and matches soil intake rates in order to prevent irrigation induced erosion, runoff, and deep percolation.

**Feature Measure:** Feet of Handline installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,280.0

**Scenario Total Cost:** $9,273.85

**Scenario Cost/Unit:** $7.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Handline, w/Appurtenances | 321 | Handline irrigation system that includes pipe, sprinklers, connections and appurtenances. Includes materials only. | Foot | $4.21 | 1280 | $5,388.80 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |

**Practice:** 442 - Sprinkler System

**Scenario** #8 - Traveling Gun System, 2 inch or less diameter Hose

**Scenario Description:**

A portable small gun system with <=2" hose and mover; used to apply irrigation or waste water on small fields. System installation includes a flowmeter. A small traveling gun irrigation system is installed to apply water uniformly and at an acceptable application rate operated under pressure to effectively irrigate less than 3 acres. The irrigation system is installed with all necessary appurtenances. Resource concerns: Soil Erosion (Concentrated flow erosion, e.g. overflowing waste storage) and Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from liquid manure) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Conservation Crop Rotation (328), Cover Crop (340), Nutrient Management (590), Waste Transfer (634)

**Before Situation:**

An existing traveling gun on a 2.5 acre field is inefficient and is not applying water uniformly or not at an acceptable application rate. Excess applied water causes irrigation induced erosion, runoff and deep percolation. The runoff and deep percolation degrade the receiving waters.

**After Situation:**

A small traveling gun irrigation system is installed to irrigate 2.5 acres based on the determined spacing needs. Irrigation is applied efficiently and uniformly to maintain adequate soil water for plant growth without causing excessive water loss, erosion, or water quality degradation The irrigation system is installed with all necessary appurtenances.

**Feature Measure:** Number of Traveling Gun Systems

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $28,262.05

**Scenario Cost/Unit:** $28,262.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Irrigation, Traveling Gun System with <= 2" Nominal size hose, and appurtenances light duty | 1478 | Irrigation, Traveling Gun System with <= 2" Nominal size hose with appurtenances. This includes the sprinkler gun, traveler cart, hard hose, reel, connections, controls, and installation. Normal hose length 500' | Inch Diameter | $12,257.34 | 2 | $24,514.68 |

**Practice:** 442 - Sprinkler System

**Scenario** #9 - Traveling Gun System, >2 to 3 inch Hose

**Scenario Description:**

A portable big gun system with >2 to 3" hose and mover; used to apply waste water from animal feeding operations. System installation includes a flowmeter. This traveling big gun unit includes a sprinkler, towable cart, 1000’ or more of PE hard hose, a self propelled reel that moves the sprinkler toward the reel during operation. The reel attaches to a mainline with appropriately designed towpath width. The scenario describes an irrigation system that is typical to confined animal feeding operations. Resource concerns: Soil Erosion (Concentrated flow erosion, e.g. overflowing waste storage) and Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from liquid manure) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Conservation Crop Rotation (328), Cover Crop (340), Nutrient Management (590), Waste Transfer (634)

**Before Situation:**

A confined, animal operation has a waste management system that exceeds its capacity, or a operation that does not have a waste management system in place. The inefficiency of the existing system or the lack of a waste management system has an impact on the soil and water quality. Animal waste runs off and degrades the receiving waters.

**After Situation:**

The big gun applies animal manure in an appropriate quantity and location that eliminates both runoff of the manure and deep percolation of excess nutrients, salts, and pathogens. The big gun system is typically located on 50 acres or less of hay/pasture land, or 100 acres or less of cropland. The system includes a large irrigation gun with 1” to 1½” orifice mounted onto a movable cart. 1000’ or more flexible 3” PE pipe is attached to the cart on one end and a large reel on the other end. The reel serves as storage are for the pipe as the cart moves back to the reel. The reel is turned by a small engine which gradually pulls the flexible pipe and cart back to the reel/base.

**Feature Measure:** Number of Traveling Gun Systems

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $27,784.39

**Scenario Cost/Unit:** $27,784.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Irrigation, Traveling Gun System, > 2" to 3 " Nominal size hose | 1479 | Irrigation, Traveling Gun System with 2.3 to 3 " Nominal size hose with appurtenances. This includes the sprinkler gun, traveler cart, hard hose, reel, connections, controls, and installation. Normal hose length 1000'. | Inch Diameter | $8,012.34 | 3 | $24,037.02 |

**Practice:** 442 - Sprinkler System

**Scenario** #10 - Traveling Gun System, > 3 inch Hose

**Scenario Description:**

A portable big gun system with > 3" hose and mover; used to apply waste water from animal feeding operations. System installation includes a flowmeter. This traveling big gun unit includes a sprinkler, towable cart, 1200' or more of >3" diameter PE hard hose, a self propelled reel that moves the sprinkler toward the reel during operation. The reel attaches to a mainline with appropriately designed tow-path width. The scenario describes an irrigation system that is typical to confined animal feeding operations. Resource concerns: Soil Erosion (Concentrated flow erosion, e.g. overflowing waste storage) and Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from liquid manure) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Conservation Crop Rotation (328), Cover Crop (340), Nutrient Management (590), Waste Transfer (634)

**Before Situation:**

A confined, animal operation has a waste management system that exceeds its capacity, or a operation that does not have a waste management system in place. The inefficiency of the existing system or the lack of a waste management system has an impact on the soil and water quality. Animal waste runs off and degrades the receiving waters.

**After Situation:**

The big gun applies animal manure in an appropriate quantity and location that eliminates both runoff of the manure and deep percolation of excess nutrients, salts, and pathogens. The big gun system is typically located on 50 acres or less of hay/pasture land, or 100 acres or less of cropland. The system includes a large irrigation gun with 1" to 1½" orifice mounted onto a movable cart. 1200' or more flexible 4" PE pipe is attached to the cart on one end and a large reel on the other end. The reel serves as storage are for the pipe as the cart moves back to the reel. The reel is turned by a small engine which gradually pulls the flexible pipe and cart back to the reel/base.

**Feature Measure:** Number of Traveling Gun Systems

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $51,306.29

**Scenario Cost/Unit:** $51,306.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Irrigation, Traveling Gun System, > 3" Nominal size hose | 1762 | Irrigation, Traveling Gun System with > 3" Nominal size hose with appurtenances. This includes the sprinkler gun, traveler cart, hard hose, reel, connections, controls, and installation. Normal hose length 1300' | Each | $47,558.92 | 1 | $47,558.92 |

**Practice:** 442 - Sprinkler System

**Scenario** #11 - Big Gun, Stationary

**Scenario Description:**

A portable big gun without a mover or reel; used to apply used to apply irrigation or waste water on small fields or pastures. A small traveling gun irrigation system is installed to apply water uniformly and at an acceptable application rate operated under pressure to effectively irrigate small acreages of pasture or cropland. The irrigation system is installed with all necessary appurtenances. Resource concerns: Soil Erosion (Concentrated flow erosion, e.g. overflowing waste storage) and Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from liquid manure) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Conservation Crop Rotation (328), Cover Crop (340), Nutrient Management (590), Waste Transfer (634)

**Before Situation:**

A confined, animal operation has a waste management system that exceeds its capacity, or a operation that does not have a waste management system in place. The inefficiency of the existing system or the lack of a waste management system has an impact on the soil and water quality. Animal waste runs off and degrades the receiving waters.

**After Situation:**

The big gun applies animal manure in an appropriate quantity and location that eliminates both runoff of the manure and deep percolation of excess nutrients, salts, and pathogens. The big gun is typically located on 3 acres of pasture or cropland. This includes a large irrigation gun with 1” to 1½” orifice mounted onto a movable cart which is attached to risers with a short section of hose. The Big Gun cart is moved by hand from one riser to another as needed throughout the field.

**Feature Measure:** Number of Big Guns

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,145.10

**Scenario Cost/Unit:** $6,145.10

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Irrigation, Traveling Gun System with <= 2" Nominal size hose, and appurtenances light duty | 1478 | Irrigation, Traveling Gun System with <= 2" Nominal size hose with appurtenances. This includes the sprinkler gun, traveler cart, hard hose, reel, connections, controls, and installation. Normal hose length 500' | Inch Diameter | $12,257.34 | 0.19 | $2,328.89 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |

**Practice:** 442 - Sprinkler System

**Scenario** #12 - Pod System

**Scenario Description:**

A portable irrigation system consisting of Polyethylene (PE) pipe and pods that have attached sprinklers. This scenario addresses installation of all pod style irrigation sprinkler systems. System installation includes a flowmeter. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

Pastureland is flood irrigated and has poor irrigation efficiency and distribution uniformity. The slope and irregular shape of the field limit the potential for improved management to improve the irrigation efficiency or the distribution uniformity. Irrigation water moves both within the field and off it, resulting in wet areas, runoff and deep percolation. Runoff from the field flows into streams, water courses, and other water bodies. Excess applied irrigation water infiltrates into ground water causing degradation to the receiving waters.

**After Situation:**

A 10 acre irrigated pasture with a medium pressure irrigation system consisting of sprinkler pods along a PE line is installed. The pods and PE line are placed in different sections of the pasture by dragging both with a four wheeler. The PE line is 660 feet in length and has 14 pods evenly spaced along its length. The improved distribution uniformity and irrigation efficiency reduces the inefficient use of water on irrigated land, reducing irrigation water applied and energy use. Water application rates meet the pasture vegetation consumptive use requirements. Runoff and deep percolation as a result of irrigation are eliminated, and the receiving waters are no longer degraded.

**Feature Measure:** Number of Sprinkler Pods

**Scenario Unit::** Each

**Scenario Typical Size:** 12.0

**Scenario Total Cost:** $7,002.25

**Scenario Cost/Unit:** $583.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Pod System, w/Appurtenances | 323 | Pod irrigation system that includes pod, pipe, sprinklers, connections, and appurtenances. Includes materials only. | Each | $254.03 | 12 | $3,048.36 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 3 | $206.52 |

**Practice:** 442 - Sprinkler System

**Scenario** #13 - Renovation of Existing Overhead or Wheel line Sprinkler System

**Scenario Description:**

Center Pivot and Linear Move sprinkler systems are used in large crop fields with fairly regular field borders and flat topography. The scenario involves changing nozzles on center pivot or lateral move irrigation systems to low-pressure systems to improve efficiency of water use and reduce energy use. This scenario is intended for cropland areas where the objective is water conservation. A typical scenario assumes a 1300 LF span, including end booms renozzled with low-pressure nozzles. Renovation system installation includes a flowmeter. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

A center pivot or lateral move system has high pressure sprinklers. The nozzles are worn and water is applied non-uniformly. Water runs off the field and degrades the receiving waters. Deep percolation in some parts of the field degrades the ground water quality. The runoff from the field causes soil erosion. The high pressure requirement for the system requires excess energy use.

**After Situation:**

A Center Pivot or Linear Move sprinkler system with a span of 1300 linear feet is re-nozzled with low-pressure nozzles. The irrigation water is applied efficiently and uniformly to maintain adequate soil moisture for optimum plant growth. Runoff and deep percolation are eliminated, and the surface and ground water is no longer degraded. The irrigation induced soil erosion caused by runoff is also eliminated. The lower pressure requirements of the sprinklers reduces the energy used by the pump.

**Feature Measure:** Length of Lateral Retrofitted

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,300.0

**Scenario Total Cost:** $14,174.25

**Scenario Cost/Unit:** $10.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Irrigation, Sprinkler Package, Renozzle or Retrofit, with drops and pressure regulators | 1480 | Sprinkler Package - Rennovation including sprinkler nozzle addition, and/or replacement, including new pressure regulators and drops. | Foot | $7.74 | 1300 | $10,062.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |

**Practice:** 442 - Sprinkler System

**Scenario** #14 - Retrofit, Irrigation Automation

**Scenario Description:**

The typical scenario consists of retrofitting an existing, functional, pump and sprinkler or micro irrigation system. The existing system may be pressurized by a pump, or by gravity elevation drop. The retrofit includes the addition of electronic/computer based automatic control systems. Typical components may include any of the following: Soil moisture sensors, air and soil temperature sensors, weather station data collector, wireless communication base station, pump automation electronic controller, valve automation electronic controller, web or cellular phone based software interlink.

**Before Situation:**

The before practice situation is characterized by manual operation of an existing, functional, irrigation system based on non scientific estimates of soil moisture levels and air temperature. Irrigation, frost control, and cooling operations are based on conservative estimates by the land owner, resulting in overwatering of the crop and running pumping systems longer than necessary. The operator typically drives a vehicle a considerable distance to turn the pump station on and off. The current operation of the system results in significant energy and water waste.

**After Situation:**

The after practice situation is characterized by operation of the retrofitted irrigation system for irrigation, frost control, and cooling only when necessary based on soil moisture and air temperature measurements. Off-site operation of the pumping system reduces vehicle energy use. Significant energy and water conservation is achieved through scientific based irrigation system/pumping plant management/automation. Associated practices/activities may include: Irrigation Water Management (449), Pump Station (533) and 374-Farmstead Energy Improvement. The resource concern is inefficient use of water and energy during farm operations, which increases water use and dependence on non-renewable energy sources. These concerns are addressed through irrigation system automation.

**Feature Measure:** Field Size in Acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $10,086.59

**Scenario Cost/Unit:** $1,008.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 6 | $170.40 |
| **Materials** | | | | | | |
| Switches and Controls, temp sensors | 1192 | Temperature and soil moisture sensors installed as part of an electronic monitoring (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $666.86 | 8 | $5,334.88 |
| Switches and Controls, programmable controller | 1193 | Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $170.29 | 1 | $170.29 |
| Switches and Controls, Wi-Fi system and software | 1194 | Software with built-in cellular or Wi-Fi communication commonly used to control pumps and irrigation systems | Each | $457.13 | 1 | $457.13 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 3 | $206.52 |

**Practice:** 442 - Sprinkler System

**Scenario** #16 - Solid Set, Above Ground Laterals

**Scenario Description:**

A solid set irrigation system with buried submains and above ground laterals such as polyethylene flexible tubing. System installation includes a flowmeter. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

The typical installation will be on an orchard or vineyard with some existing inefficient irrigation.

**After Situation:**

An irrigation system is utilized to provide highly efficient irrigation to an orchard or vineyard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced. The typical system is a permanent system, installed on a 40 acre orchard. The orchard in the scenario has a plant spacing of 15 feet x 22 feet. Laterals are spaced 22 feet apart, however other spacing for this scenario apply. This system utilizes sprayers or mini-sprinklers at each tree or plant as the water application device. This system typically includes a filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to provide uniform application between sprayers. Does not include Pump, Power source, Water source (well or reservoir).

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $95,226.91

**Scenario Cost/Unit:** $2,380.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Micro Irrigation, Media Filter, 30" to 48" Dia. tank, Equipped for Automatic Flush | 1482 | Sand or media filter for Micro irrigation system. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $5,347.77 | 2 | $10,695.54 |
| Micro Irrigation, emitters or sprays and tubing | 1489 | Emitters or sprays that are installed above ground for micro or drip irrigation. Includes installation and connections to the supply and flushing laterals. Tubing for the emitters is included in this item. | Foot | $1.02 | 79200 | $80,784.00 |

**Practice:** 442 - Sprinkler System

**Scenario** #29 - Solid Set System with automation

**Scenario Description:**

A solid set irrigation system. System installation includes a flowmeter. Automation includes the addition of electronic/computer based automatic control systems. Typical components may include any of the following: Soil moisture sensors, air and soil temperature sensors, weather station data collector, wireless communication base station, pump automation electronic controller, valve automation electronic controller, web or cellular phone based software interlink. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

The typical installation will be on cropland with some existing inefficient irrigation. The farm is typically producing specialty crops, such as fresh vegetables.

**After Situation:**

The system is installed on 10 acres. The installed solid set system has 3-4 inch pipe sizes and sprinklers set 30 – 50 ft apart. Improved distribution uniformity and irrigation efficiency will result. Automation, sensors and remote access facilitates high level of control over water applications.

**Feature Measure:** Area of Irrigation System

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $59,401.37

**Scenario Cost/Unit:** $5,940.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Solid Set, w/Appurtenances | 324 | Solid Set irrigation system that includes pipe, sprinklers, connections, installation and appurtenances. | Acre | $4,916.67 | 10 | $49,166.70 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |
| Nodes, Expansion, Variable Rate Irrigation | 2464 | Expansion Nodes that provide both power and control signals to valves. | Each | $648.73 | 10 | $6,487.30 |

**Practice:** 443 - Irrigation System, Surface and Subsurface

**Scenario** #1 - Surge Valve & Controller

**Scenario Description:**

This scenario would typically include installation and utilization of a 10-inch surge valve with automated controller (including all appurtenances) and installation labor needed to convert from a conventional surface irrigated system to a surge irrigation system. Typical field size is 80 acres. The surge valve will be used with PVC Gated Pipe or PE Gated Tubing to convey and distribute irrigation water to alternating irrigation sets in a timed surge cycle that results in reduced a surging irrigation application. The surging action increases rate of advance along set length, reduces deep percolation at upper end of field, increases uniformity of application along row length, and on lower intake soils can significantly reduce runoff losses. The result is improved irrigation efficiency, reduced leaching and erosion losses, and conserved energy. This scenario does not include gated pipe or associated practices. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation- Excess nutrients in surface and ground waters, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities Associated Practices: 464-Irrigation Land leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.

**Before Situation:**

Unacceptable irrigation application uniformity along existing surface irrigation system furrow or border length caused by excessive run length or soil infiltration rate when operated with continuous inflow on existing system. System is over irrigated in attempt to adequately irrigate low end of field.

**After Situation:**

A surge surface irrigation system is in place. After implementation, distribution uniformity and irrigation efficiency is improved, by reducing irrigation application volume and deep percolation losses. Runoff reductions, reduced energy use, and air quality improvements can also result.

**Feature Measure:** Number of Surge Valves

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,293.11

**Scenario Cost/Unit:** $2,293.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| **Materials** | | | | | | |
| Surge Valve And Controller | 1477 | Surge Valve and Controller, with appurtenances. Material cost includes valve, controller, all appurtenances, and mobilization. | Each | $2,236.31 | 1 | $2,236.31 |

**Practice:** 443 - Irrigation System, Surface and Subsurface

**Scenario** #2 - Aluminum Gated Pipe

**Scenario Description:**

Installation of surface Aluminum gated pipe to efficiently convey and distribute irrigation water in irrigation furrows, borders, or contour levees. A typical scenario would include 1,320 feet of 10-inch Aluminum gated pipe, with 40 inch gate spacing used to irrigate 60 acres. Appurtenances include: gates, couplings, fittings, in-line valves, pressure relief valves, and air vent valves. Does not include flow meters, or a permanent inlet structure with or without filtration. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable Plant productivity and health. Associated Practices: 464-Irrigation Land Leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.,

**Before Situation:**

Typical before situation would include conveyance of water to surface irrigation distribution points with earthen ditches and distribution to individual furrows, borders, or contour levies by siphon tubes. The existing system would experience significant seepage ditch losses, and poor distribution uniformity.

**After Situation:**

The installation will improve distribution uniformity, irrigation efficiency, and eliminate or reduce ditch seepage.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 2,442.0

**Scenario Total Cost:** $12,505.30

**Scenario Cost/Unit:** $5.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| **Materials** | | | | | | |
| Pipe, aluminum, smooth wall, weight priced | 1382 | Aluminum manufactured into smooth wall pipe | Pound | $4.55 | 2686 | $12,221.30 |

**Practice:** 443 - Irrigation System, Surface and Subsurface

**Scenario** #3 - Polyvinyl Chloride (PVC) Gated Pipe

**Scenario Description:**

Installation of surface PVC gated pipe to efficiently convey and distribute irrigation water in irrigation furrows, borders, or contour levees. A typical scenario would include 1,320 feet of 10-inch PVC gated pipe, with 40 inch gate spacing used to irrigate 60 acres. Appurtenances include: gates, couplings, fittings, in-line valves, pressure relief valves, and air vent valves. Does not include flow meters, or a permanent inlet structure with or without filtration. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable Plant productivity and health. Associated Practices: 464-Irrigation Land Leveling, 533-Pumping Plant, 449-Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.

**Before Situation:**

Typical before situation would include conveyance of water to surface irrigation distribution points with earthen ditches and distribution to individual furrows, borders, or contour levies by siphon tubes. The existing system would experience significant seepage ditch losses, and poor distribution uniformity.

**After Situation:**

The installation will improve distribution uniformity, irrigation efficiency, and eliminate or reduce ditch seepage.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 3,320.0

**Scenario Total Cost:** $7,624.52

**Scenario Cost/Unit:** $2.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 3652 | $7,340.52 |

**Practice:** 443 - Irrigation System, Surface and Subsurface

**Scenario** #4 - Poly Irrigation Tubing

**Scenario Description:**

This practice includes installation of thin wall Polyethylene (PE) irrigation tubing with 2½-inch gates, or gated pipe installed in shallow above ground trenches to replace above ground canals used to deliver water to individual basins within a contour levee or basin surface irrigation system. The typical scenario will use 1,320 feet of 15-inch, 10 mil, PE irrigation tubing (a 1,320-foot roll weighs 250 pounds) with 100 2½-inch gates spaced approximately 13 feet apart, installed in shallow above ground trenches to replace above ground canals used to deliver water to individual basins within a 40-acre irrigated field. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation- Excess nutrients in surface and ground waters, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities Associated Practices: 464-Irrigation Land Leveling, 533-Pumping Plant, 449-Irrigation Water Management, 430-Irrigation Pipeline, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

Typical before situation would include a contour levee or basin surface irrigation system. Irrigation water is delivered to individual basins in a 40-acre rice field split into paddies using irrigation canals and field ditches.

**After Situation:**

After implementation irrigation efficiency is improved, while reducing irrigation application volume, runoff, evaporation losses, and cold water damage to crops. Reduced energy use and air quality improvements can also result.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 250.0

**Scenario Total Cost:** $833.00

**Scenario Cost/Unit:** $3.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| **Materials** | | | | | | |
| Pipe, PE, collapsible, weight priced | 1385 | Polyethylene (PE) compound manufactured into collapsible tubing | Pound | $1.48 | 250 | $370.00 |
| Flap gate, plastic, 2½" | 1424 | 2 1/2" plastic flap gate for poly irrigation tubing. Materials only. | Each | $1.79 | 100 | $179.00 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #3 - Intermediate IWM <30 acres

**Scenario Description:**

A medium intensity irrigation water management system for producers using a checkbook method or regional weather data to schedule irrigations or to manage crops for frost protection. Data recorded includes crops grown, evapotranspiration rates, soil moisture conditions, irrigation dates, set times, depths of irrigation applied, and amount of rainfall. All data is recorded on a daily basis. For a typical scenario, soil moisture is determined from soil samples and the feel method. May require only 1 soil monitoring site. Evapotranspiration, rainfall, and applied irrigation are documented to determine the soil moisture level and when to apply irrigation. Irrigation amounts are recorded from a flow meter near the pump, or from calculations of set times and application rates. Records are input manually into irrigation scheduling forms or computer programs. Payment by "Each", referring to Each Field or Set of Fields that are managed the same. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface

**Before Situation:**

The farmer decides when to irrigate based on traditional intervals and run times, general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 8 acre field with an irrigation system.

**After Situation:**

Irrigations are scheduled based on soil moisture levels calculated using the water balance or check book method or current regional weather conditions. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

**Feature Measure:** Each Field or set of fields that are

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,275.75

**Scenario Cost/Unit:** $1,275.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 27 | $1,275.75 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #4 - Intermediate IWM >= 30 acres

**Scenario Description:**

A medium intensity irrigation water management system for producers using a checkbook method or regional weather data to schedule irrigations or to manage crops for frost protection.. Data recorded includes crops grown, evapotranspiration rates, soil moisture conditions, irrigation dates, set times, depths of irrigation applied, and amount of rainfall. All data is recorded on a daily basis. For a typical scenario, soil moisture is determined from soil samples and the feel method. Evapotranspiration, rainfall, and applied irrigation are documented to determine the soil moisture level and when to apply irrigation. Irrigation amounts are recorded from a flow meter near the pump, or from calculations of set times and application rates. Will likely require 2 or more soil monitoring sites. Records are input manually into irrigation scheduling forms or computer programs. The owner/operator will include field staff to carry out activities. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface

**Before Situation:**

The farmer decides when to irrigate based on traditional intervals and run times, general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 60 acre field with an irrigation system.

**After Situation:**

Irrigations are scheduled based on soil moisture levels calculated using the water balance or check book method or current regional weather conditions. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

**Feature Measure:** Irrigated Area Managed

**Scenario Unit::** Acre

**Scenario Typical Size:** 60.0

**Scenario Total Cost:** $3,176.80

**Scenario Cost/Unit:** $52.95

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 48 | $2,268.00 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #5 - Advanced IWM <30 acres

**Scenario Description:**

A high intensity irrigation water management system for producers using localized weather stations and/or soil moisture sensors to determine crop water requirements, and schedule irrigations accordingly or to manage crops for frost protection. Other methods such as the checkbook or touch methods may be used as a check on soil moisture sensor data. For this scenario, weather data or soil moisture, is determined by automated or manual moisture monitoring stations that may be equipped with telemetry data. Will likely require 1 or more soil monitoring sites. Irrigation amounts are recorded from a flow meter near the pump. For automated systems telemetry data is automatically sent to a computer with irrigation software. Irrigators can also receives real time data via mobile phone applications Payment by "Each", referring to Each Field or Set of Fields that are managed the same. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface

**Before Situation:**

The farmer decides when to irrigate based on traditional intervals and run times, general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 8 acre field with a surface irrigation system.

**After Situation:**

Irrigations are scheduled based on measured soil moisture levels or current weather conditions. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

**Feature Measure:** Each Field or set of fields that are

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,842.75

**Scenario Cost/Unit:** $1,842.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 39 | $1,842.75 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #6 - Advanced IWM >= 30 acres

**Scenario Description:**

A high intensity irrigation water management system for producers using localized weather stations and/or soil moisture sensors to determine crop water requirements, and schedule irrigations accordingly or to manage crops for frost protection. Other methods such as the checkbook or touch methods may be used as a check on soil moisture sensor data. For this scenario, weather data or soil moisture, is determined by automated or manual moisture monitoring stations that may be equipped with telemetry data. Will likely require 2 or more soil monitoring sites. Irrigation amounts are recorded from a flow meter near the pump. For automated systems telemetry data is automatically sent to a computer with irrigation software. Irrigators can also receives real time data via mobile phone applications. The owner/operator will include field staff in carrying out activities. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface

**Before Situation:**

The farmer decides when to irrigate based on traditional intervals and run times, general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 60 acre field with a surface irrigation system.

**After Situation:**

Irrigations are scheduled based on measured soil moisture levels or current weather conditions. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

**Feature Measure:** Irrigated Area Managed

**Scenario Unit::** Acre

**Scenario Typical Size:** 60.0

**Scenario Total Cost:** $4,387.20

**Scenario Cost/Unit:** $73.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 64 | $3,024.00 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #7 - IWM with Soil Moisture Sensors

**Scenario Description:**

This practice includes the installation of soil moisture sensors such as tensiometers, gyp blocks, capacitance sensors etc., that are installed and read to determine point in time soil moisture by depth. The installation includes the purchase of soil moisture meters and sensors, installation equipment, and labor to install and read sensors or meter. Typical Scenario involves installation of resistance sensor blocks in a 80 acre field of irrigated cropland. Producer periodically monitors the station during the growing season to determine timing and amounts of water to apply. Producer keeps records of collected data and resulting irrigation decisions. Meters used to read sensors may be portable. This scenario only applies to one year of IWM. The appropriate labor-only IWM scenario applies in subsequent contract years. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface

**Before Situation:**

Producer uses feel method to estimate soil moisture for scheduling irrigation.

**After Situation:**

Producer has installed four sensors at each monitoring site to a depth of four feet with one sensor representing each foot of depth. Producer uses periodic soil moisture measurements to schedule irrigation resulting in improved irrigation water management and reduced energy use.

**Feature Measure:** Number of Measuring Sites

**Scenario Unit::** Each

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $2,962.95

**Scenario Cost/Unit:** $1,481.48

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| **Materials** | | | | | | |
| Soil Moisture Meter | 1455 | Soil Moisture Sensor Reader. Equipment only. | Each | $292.95 | 1 | $292.95 |
| Soil Moisture Sensor | 1456 | Soil moisture resistance sensor W/10' cables. Equipment only. | Each | $37.69 | 8 | $301.52 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #8 - IWM with Soil Moisture Sensors with Data Recorder

**Scenario Description:**

This practice includes the installation of electrical soil moisture sensors such as capacitance or resistance sensors that are monitored to determine soil moisture. The installation includes the purchase of soil moisture sensors, installation equipment (probe or auger), and a data logger to log continuous soil moisture data that can be downloaded to a personal computer and associated graphing software. Typical Scenario involves installation of resistance sensor blocks in a 120 acre field of sprinkler irrigated cropland. Producer periodically monitors the station during the growing season to determine timing and amounts of water to apply. Producer keeps records of collected data and resulting irrigation decisions. This scenario only applies to one year of IWM. The appropriate labor-only IWM scenario applies in subsequent contract years. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface

**Before Situation:**

Producer uses feel method to estimate soil moisture for scheduling irrigation in the field.

**After Situation:**

Producer has installed four sensors at each monitoring site to a depth of four feet with one sensor representing each foot of depth. Producer periodically downloads continuously recorded soil moisture measurements that are used to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use.

**Feature Measure:** Number of Measuring Sites

**Scenario Unit::** Each

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $4,230.96

**Scenario Cost/Unit:** $2,115.48

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| **Materials** | | | | | | |
| Data Logger | 1453 | Data Logger W/Graphic Output for water management. Materials only. | Each | $780.48 | 2 | $1,560.96 |
| Soil Moisture Sensor | 1456 | Soil moisture resistance sensor W/10' cables. Equipment only. | Each | $37.69 | 8 | $301.52 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #9 - IWM with Irrigation Evaluation

**Scenario Description:**

Perform a systematic irrigation evaluation to gather information the producer can use to conserve and stretch limited water supplies by evaluating the performance of the irrigation system and its management. In an evaluation, measurements are made during an irrigation event to track and quantify the destination of applied water to calculate uniformity and water losses. In addition, the producer is given the opportunity to discuss his/her methods for determining when to irrigation and how much to apply (scheduling) to see if there might be opportunities for improvement. A report is developed for the producer describing system performance including how uniformly the water is being applied, how much is being applied during the irrigation event, the effect of the current irrigation scheduling strategy and what improvements would be beneficial. Producer bases irrigation decisions on soil, plant or climate based crop water use information and tracks and records irrigation applications. Producer keeps records of collected data and resulting irrigation decisions. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface

**Before Situation:**

Producer can not quantify irrigation performance and does not know with certainty where improvement can be made.

**After Situation:**

One evaluation is performed for the field or land unit of interest. Water destinations are identified and quantified. The producer knows the uniformity of the irrigation system and efficiency of the system and its management for that irrigation event. The producer knows where to focus improvements in the system or its management. Water applications are based on crop needs.

**Feature Measure:** Per Evaluation

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,067.98

**Scenario Cost/Unit:** $4,067.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 21 | $596.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 14 | $1,581.58 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #16 - IWM w weather station

**Scenario Description:**

This practice includes the installation of a weather station that is monitored to determine crop water use, status of heat and/or frost conditions to permit the producer to make informed irrigation decisions. The installation includes the purchase and installation of equipment, and a data logger to log continuous weather data including rainfall, temp, solar radiation, humidity, wind speed and soil moisture sensors that can be downloaded to a personal computer and associated graphing software. Typical Scenario involves installation on a 120 acre field of irrigated cropland. Producer periodically monitors the station during the growing season to determine timing and amounts of water to apply based on soil moisture sensors, field checks and weather station data. Producer keeps records of collected data and resulting irrigation decisions. This scenario only applies to year one of IWM. The appropriate labor-only IWM scenario applies in subsequent contract years. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface

**Before Situation:**

To meet crop water requirements, the producer schedules irrigations based on the calendar and what has apparently worked in the past. For cooling/frost protection, irrigation start and run times are based on broad regional weather forecasts.

**After Situation:**

Producer has installed a weather station and periodically downloads continuously recorded data that is used to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. Field checks are made by irrigator to ground truth station data with crop.

**Feature Measure:** Number of weather stations

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,407.92

**Scenario Cost/Unit:** $5,407.92

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |
| **Materials** | | | | | | |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Switches and Controls, temp sensors | 1192 | Temperature and soil moisture sensors installed as part of an electronic monitoring (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $666.86 | 1 | $666.86 |
| Data Logger with Telemetry System | 1454 | Data Logger W/Graphic Output for water management and telemetry - data communication device with power supply in a weather proof enclosure. Equipment only. | Each | $1,723.25 | 1 | $1,723.25 |
| Soil Moisture Meter | 1455 | Soil Moisture Sensor Reader. Equipment only. | Each | $292.95 | 1 | $292.95 |
| Soil Moisture Sensor | 1456 | Soil moisture resistance sensor W/10' cables. Equipment only. | Each | $37.69 | 2 | $75.38 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |

**Practice:** 450 - Anionic Polyacrylamide (PAM) Application

**Scenario** #1 - PAM Application

**Scenario Description:**

Control of irrigation induced erosion (typically in furrow irrigated fields) through the direct application of water-soluble Polyacrylamide (PAM) into the irrigation water supply with existing metering equipment. PAM comes in granular, liquid oil emulsion, tablet, and block forms. This typical application is for an 80-acre furrow irrigated row crop field, with one PAM application (1-1.5 lb/ac, creating a 10 ppm concentration of the granular PAM in the head ditch metered via large fish feeder) at first irrigation followed by two additional applications (reduced rates of 0.5-1 lb/ac, or about 1-5 ppm in the inflow water) after cultivations. Resource Concern: Soil erosion. Associated Practices: 443-Irrigation System, Surface and Subsurface, 449-Irrigation Water Management.

**Before Situation:**

Irrigated lands susceptible to irrigation-induced erosion, excluding peat soils, and where the sodium adsorption ratio (SAR) of irrigation water is less than 15.

**After Situation:**

Erosion is minimized in furrow irrigated field.

**Feature Measure:** Weight of PAM Applied

**Scenario Unit::** Pound

**Scenario Typical Size:** 240.0

**Scenario Total Cost:** $1,238.40

**Scenario Cost/Unit:** $5.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| **Materials** | | | | | | |
| Anionic Polyacrylamide (PAM) | 1279 | Water Soluble PAM, granular bulk, for mixing with irrigation water. Includes materials and shipping only. | Pound | $3.74 | 240 | $897.60 |

**Practice:** 450 - Anionic Polyacrylamide (PAM) Application

**Scenario** #2 - PAM Application, with Metering Equipment

**Scenario Description:**

Control of irrigation induced erosion (typically in furrow irrigated fields) through the direct application of water-soluble Polyacrylamide (PAM) into the irrigation water supply. Includes PAM material, application/metering equipment, and labor. PAM comes in granular, liquid oil emulsion, tablet, and block forms. This typical application is for a 40-acre furrow irrigated row crop field, with one PAM application (1-1.5 lb/ac, creating a 10 ppm concentration of the granular PAM in the head ditch metered via large fish feeder) at first irrigation followed by two additional applications (reduced rates of 0.5-1 lb/ac, or about 1-5 ppm in the inflow water) after cultivations. Resource Concern: Soil erosion. Associated Practices: 443-Irrigation System, Surface and Subsurface, 449-Irrigation Water Management.

**Before Situation:**

Irrigated lands susceptible to irrigation-induced erosion, excluding peat soils, and where the sodium adsorption ratio (SAR) of irrigation water is less than 15.

**After Situation:**

Erosion is minimized in furrow irrigated field.

**Feature Measure:** Weight of PAM Applied

**Scenario Unit::** Pound

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $781.26

**Scenario Cost/Unit:** $6.51

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| PAM Application, metering equipment | 2058 | Metering equipment to dispense PAM into irrigation water at a controlled rate. Equipment only. | Each | $162.06 | 1 | $162.06 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 6 | $170.40 |
| **Materials** | | | | | | |
| Anionic Polyacrylamide (PAM) | 1279 | Water Soluble PAM, granular bulk, for mixing with irrigation water. Includes materials and shipping only. | Pound | $3.74 | 120 | $448.80 |

**Practice:** 460 - Land Clearing

**Scenario** #1 - Non-Heavy Equipment

**Scenario Description:**

Site preparation of a field with a labor crew, chainsaws, chippers or similar equipment removing trees and shrubs to achieve a conservation objective. Typical scenario is approximately 1 acre of trees and shrubs to be cleared. The resource concern is determined by the conservation objective met with the final practice applied to the field.

**Before Situation:**

Forested land of approximately 1 acre, with moderate density evenly spaced tree canopy. Could be along a proposed access road corridor or other small acreages where structural practices are being installed in a planned conservation system. Removal of trees, brush, and other vegetation is necessary in order to implement another conservation objective, not including land clearing primarily for crop production purposes.

**After Situation:**

Labor crew uses chainsaws, chippers, or similar equipment to clear trees and prepare the field for a conservation objective, includes on-site disposal as necessary. Associated practices, like plantings, other structures, or irrigation/drainage water management practices, would be contracted separately as needed.

**Feature Measure:** Area Cleared

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $853.40

**Scenario Cost/Unit:** $853.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 24 | $102.96 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 24 | $681.60 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |

**Practice:** 460 - Land Clearing

**Scenario** #2 - Heavy Equipment

**Scenario Description:**

Site preparation of a field with dozer or equivalent heavy equipment to achieve a conservation objective. Typical scenario is approximately 10 acres of trees and shrubs to be cleared. The resource concern is determined by the conservation objective met with the final practice applied to the field.

**Before Situation:**

Forested land of approximately 10 acres, with moderate density evenly spaced tree canopy. Removal of trees and stumps is needed in order to implement another conservation objective. Does not include land clearing for crop production purposes.

**After Situation:**

Crew uses 200 HP dozer to clear trees and prepare field for conservation objective, includes on-site debris disposal as necessary. Associated practices, like plantings, other structures, or irrigation/drainage water management practices, would be contracted separately as needed.

**Feature Measure:** Area Cleared

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $10,841.96

**Scenario Cost/Unit:** $1,084.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 40 | $7,623.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 460 - Land Clearing

**Scenario** #3 - Shrub and Brush Clearing

**Scenario Description:**

Site preparation of a field with a labor crew and chainsaws removing mostly shrubs to achieve a conservation objective such as providing access to water or forage opportunities or clearing an area for installation of a structural practice. Typical scenario is approximately 1 acre of shrubs to be cleared. The resource concern is determined by the conservation objective met with the final practice applied to the field.

**Before Situation:**

Various situations including 1) Heavy brush exists where a new structure will be installed 2) Land with dense woody vegetation is blocking access to water and other forage opportunities for livestock and wildlife, 3) Other site preparation for installation of other structural conservation practices. Does not include site preparation for vegetative practices. Does not include site preparation for crop production related activities.

**After Situation:**

Labor crew uses chainsaws to clear heavy brush and very small trees the field for a conservation objective, includes on-site disposal as necessary.

**Feature Measure:** Area Cleared

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $457.66

**Scenario Cost/Unit:** $457.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 14 | $60.06 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 14 | $397.60 |

**Practice:** 464 - Irrigation Land Leveling

**Scenario** #1 - Irrigation Land Leveling

**Scenario Description:**

Land levelling is performed on a typical field, 80 acres of irrigated crop land surface, to enhance uniform flow of surface water to improve irrigation efficiency using GPS-enabled scraper equipment. The typical volume of earth moved is 100 to 500 cubic yards per acre. Resource Concern: Excess/Insufficient - Inefficient Use of Irrigation Water Associated Conservation Practices: 433 - Irrigation System, Surface and Subsurface; 607 - Surface Drain, Field Ditch; 388 - Irrigation Field Ditch; 449 - Irrigation Water Management; or 587 - Structure for Water Control.

**Before Situation:**

Irregular field surface reduces uniformity of surface application and thus irrigation efficiency by localized ponding and/or excess runoff/run-on.

**After Situation:**

Land-Leveling greatly enhances uniform distribution of irrigation water in order to promote irrigation efficiencies.

**Feature Measure:** Volume of Earth Moved

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 16,000.0

**Scenario Total Cost:** $22,886.72

**Scenario Cost/Unit:** $1.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 260 HP | 1204 | Agricultural tractor with horsepower range of 240 to 290. Equipment and power unit costs. Labor not included. | Hour | $119.98 | 120 | $14,397.60 |
| Scraper, pull, 15 CY | 1207 | Pull type earthmoving scraper with 15 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $22.65 | 120 | $2,718.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 120 | $4,819.20 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 472 - Access Control

**Scenario** #1 - Seasonal exclusion, High production

**Scenario Description:**

Seasonally restricting access to forage fields by livestock during critical growth periods, nesting periods, or other times when livestock use of the field will damage the identified threatened resource. Resource concerns may include Undesirable plant productivity and health, Concentrated flow erosion, Soil compaction, Excessive sediment or nutrients in surface waters, or Wildlife habitat degradation. These fields are typically pastures or riparian areas where forage production is higher.

**Before Situation:**

Fields are used at times of the year when use causes damage to identified resource concerns such as plant productivity and health, erosion, soil compaction, excessive sediment or nutrients in surface waters, or wildlife habitat degradation.

**After Situation:**

Resources are protected during identified critical periods.

**Feature Measure:** Number

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $437.44

**Scenario Cost/Unit:** $87.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| **Foregone Income** | | | | | | |
| FI, Hay, General Grass | 2122 | General Grass Hay is Primary Land Use | Ton | $43.24 | 6.5 | $281.06 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |

**Practice:** 472 - Access Control

**Scenario** #2 - Seasonal exclusion, Low production

**Scenario Description:**

Seasonally restricting access to forage fields by livestock during critical growth periods, nesting periods, or other times when livestock use of the field will damage the identified threatened resource. Resource concerns may include Undesirable plant productivity and health, Concentrated flow erosion, Soil compaction, Excessive sediment or nutrients in surface waters, or Wildlife habitat degradation. These fields are typically in areas where climatic or soil conditions limit forage production.

**Before Situation:**

Fields are used at times of the year when use causes damage to identified resource concerns such as plant productivity and health, erosion, soil compaction, excessive sediment or nutrients in surface waters, or wildlife habitat degradation.

**After Situation:**

Resources are protected during identified critical periods.

**Feature Measure:** Number

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,237.38

**Scenario Cost/Unit:** $24.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| **Foregone Income** | | | | | | |
| FI, Hay, General Grass | 2122 | General Grass Hay is Primary Land Use | Ton | $43.24 | 25 | $1,081.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |

**Practice:** 472 - Access Control

**Scenario** #3 - Cattle Guard

**Scenario Description:**

Restricting access to the use of forest/farm roads and trails by the use of a cattle guard. Resource concerns include Undesirable plant productivity and health, Concentrated flow erosion, Soil compaction, Excessive sediment in surface waters, and Wildlife habitat degradation. Associated Practices include 382 Fencing.

**Before Situation:**

Roads and fields are damaged or misused by unrestricted animal access. Extensive amount of fencing (other than that needed to restrict access at the site of ingress) is not included in this scenario, but instead will be planned and installed with the Fence practice (382).

**After Situation:**

Roads and field access by livestock and wildlife is restricted. Fields and grazing systems can be managed for more production.

**Feature Measure:** Number

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,100.31

**Scenario Cost/Unit:** $5,100.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 2.5 | $1,092.48 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 18 | $41.58 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 4 | $220.12 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 8 | $974.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 9 | $255.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 14 | $562.24 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 1.5 | $42.74 |
| Cattle guard | 2144 | Standard 16' x 6' cattle guard. Materials and shipping only. | Each | $1,911.56 | 1 | $1,911.56 |

**Practice:** 472 - Access Control

**Scenario** #4 - Swing Arm Gate

**Scenario Description:**

Restricting access to the use of forest/farm roads and trails by the use of a large manufactured steel 'forest road type' swing arm gate with a lock post. Resource concerns include Undesirable plant productivity and health, Concentrated flow erosion, Soil compaction, Excessive sediment in surface waters, and Wildlife habitat degradation. Associated Practices include 382 Fencing.

**Before Situation:**

Roads and fields are damaged or misused by unrestricted animal access. Extensive amount of fencing (other than that needed to restrict access at the site of ingress) is not included in this scenario, but instead will be planned and installed with the Fence practice (382).

**After Situation:**

Roads and field access by livestock and wildlife is restricted. Fields and grazing systems can be managed for more production.

**Feature Measure:** Number

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,712.54

**Scenario Cost/Unit:** $3,712.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 7 | $16.17 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 10 | $1,116.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 9 | $255.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 11 | $441.76 |
| **Materials** | | | | | | |
| Gate, swing arm | 2150 | Steel swing arm type gate with steel post anchor. Materials and shipping only. | Each | $1,238.78 | 1 | $1,238.78 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 472 - Access Control

**Scenario** #5 - Extended Road Closure

**Scenario Description:**

Restricting access to the use of forest/farm roads and trails for an extended period of time, typically associated with decommissioning of a road. This would include installation of boulders, ecology blocks or tank traps to ensure that a road is no longer accessible. Resource concerns include Undesirable plant productivity and health, Concentrated flow erosion, Soil compaction, Excessive sediment in surface waters, and Wildlife habitat degradation.

**Before Situation:**

Roads are damaged or misused, illegal activities occur and/or forest resources are at risk. Extensive amount of fencing (other than that needed to restrict access at the site of ingress) is not included in this scenario, but instead will be planned and installed with the Fence practice (382).

**After Situation:**

Roads are protected, illegal activities are stopped and/or forest resources are secure.

**Feature Measure:** Number

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,639.06

**Scenario Cost/Unit:** $3,639.06

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 10 | $1,614.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 10 | $401.60 |
| **Materials** | | | | | | |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $110.61 | 3.5 | $387.14 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 472 - Access Control

**Scenario** #6 - Monitoring, maintenance, additional labor

**Scenario Description:**

Labor and increased time needed to control and re-route animals and traffic from sensitive areas, monitor and maintain barriers. Resource concerns include Excessive sediment in surface waters, Habitat degradation for fish and wildlife, and Undesirable plant productivity and health.

**Before Situation:**

The application of access control has resulted in increased labor and time to re-route traffic and animals from a riparian area that splits a field in half. This has also lead to more time and labor in monitoring the animals, inspecting and repairing the barrier.

**After Situation:**

Water quality is maintained, habitat is improved, and plant health is maintained by controlling access to the riparian area.

**Feature Measure:** Area of riparian area

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $149.37

**Scenario Cost/Unit:** $29.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 3 | $64.17 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 3 | $85.20 |

**Practice:** 484 - Mulching

**Scenario** #1 - Natural Materials

**Scenario Description:**

Typical use is an medium application of straw mulch or a state approved natural material that provides 60-70% soil coverage (approximately 1-2 T/ac or 1-3 inch depth when using straw). Purpose is to conserve soil moisture, reduce energy use associated with irrigations, protect soil from erosion, and/or to reduce airborne particulate matter from wind erosion, or improve soil health. Mulch may be used with critical area planting, between or in rows on orchards/vineyards or between rows of crops. Payment is based on actual acres mulched.

**Before Situation:**

Typical scenario ranges from a 0.1 to 1.0 acre site where vegetated cover is needed and/or there is a high potential for soil erosion such as around a newly constructed practice. The potential for soil erosion is high and mulch is needed to stabilize the soil and facilitate the establishment of vegetative cover and suppress weed growth. There may also be a need to reduce airborne particulates, conserve moisture, moderate soil temperature or improve soil health.

**After Situation:**

Straw mulch has been applied to areas needing mulch. Vegetative cover is established, and erosion and sedimentation is reduced. In addition there may be improvements through reductions in airborne particulates and soil temperature, increased soil moisture and improved soil quality.

**Feature Measure:** Area Covered by Mulch

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $304.02

**Scenario Cost/Unit:** $304.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 1 | $24.32 |
| Mulcher, straw blower | 1305 | Straw bale mulcher/blower to mechanically spread small or large straw bales. Labor not included. | Hour | $43.89 | 1 | $43.89 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1 | $27.12 |
| **Materials** | | | | | | |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $130.50 | 1 | $130.50 |

**Practice:** 484 - Mulching

**Scenario** #2 - Wood Chips

**Scenario Description:**

Typical applications include 2-3 inches of wood chips, or similar materials that are hardy enough to last for several years, applied primarily to reduce soil erosion and water runoff. Area mulched may be on all or portions of fields, for example, between rows of permanent crops. Payment is based on actual acres mulched and is typically only applied one time; not repeated for several years. Resource concerns addressed include soil erosion, soil quality and water quality.

**Before Situation:**

One typical scenario is on sloping avocado trees operations where very little light penetrates such that cover crops or conservation cover cannot be established. Water runoff and/or erosion are a problem.

**After Situation:**

Mulch has been applied to areas needing mulch. Erosion and sedimentation is reduced and water quality is protected.

**Feature Measure:** Area Covered by Mulch

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,305.75

**Scenario Cost/Unit:** $1,305.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 5 | $106.95 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.87 | 40 | $914.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |

**Practice:** 484 - Mulching

**Scenario** #3 - Hydromulch

**Scenario Description:**

Hydromulch is applied to at a minimum of 70% coverage to a small (0.1-0.5 ac) critical, steep sloped areas to hold soil in place until vegetation can be established. Seed source is available as part of the natural setting. If seed is needed, then do not use this practice, use 342-Critial Area Planting - hydroseeding instead.

**Before Situation:**

Typical scenario ranges from a 0.1 to 1.0 acre site such as a post-fire situation. Lack of vegetation on steep slopes near water sources or other drainages has caused very unstable conditions. Erosion potential is very high. Seed source is naturally available as part of the fire ecology.

**After Situation:**

Hydromulch is applied, perhaps along with other practices in an erosion control system. Soil erosion is reduced significantly and water ways are protected. Typical size is 1/2 acre or less. 43560 / 2 = 21780 sqft.

**Feature Measure:** Square Foot

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 21,780.0

**Scenario Total Cost:** $1,298.17

**Scenario Cost/Unit:** $0.06

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Seeding Operation, hydroseeder | 1291 | Hydroseeding with typical 1500 to 3600 gallon seeder. Includes all costs for equipment, power unit, and labor. | Acre | $2,074.34 | 0.5 | $1,037.17 |
| **Materials** | | | | | | |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $130.50 | 2 | $261.00 |

**Practice:** 484 - Mulching

**Scenario** #4 - Erosion Control Blanket, Steep Slopes

**Scenario Description:**

Installation of erosion control blanket on critical areas typically 0.1 acre in size or less, with steep slopes such as streambanks, graded gullies or road cuts. Blanket is typically made of coconut coir, wood fiber, and/or straw and is typically covered on both sides with polypropylene netting. Used to help control erosion and establish vegetative cover.

**Before Situation:**

There are areas of concentrated flow on very steep, unstable slopes, often adjacent to water courses. Soil erosion is a concern and there is little to no vegetation.

**After Situation:**

The erosion control blanket is placed on concentrated flow areas and secured with ground stables. Soil erosion is minimized and vegetative cover is established.

**Feature Measure:** Area Covered by Mulch

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 5,000.0

**Scenario Total Cost:** $961.12

**Scenario Cost/Unit:** $0.19

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Erosion Control Blanket, biodegradable | 1213 | Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only. | Square Yard | $1.32 | 556 | $733.92 |

**Practice:** 484 - Mulching

**Scenario** #5 - Plastic

**Scenario Description:**

Installation of biodegradable or polyethylene plastic or other equivalent synthetic material to conserve soil moisture, moderate soil temperature, and/or provide erosion control. Payment based on actual area covered by mulching material.

**Before Situation:**

Site conditions vary. Typically scenarios include sites of bare soils on irrigated perennials or other specialty crops. Water quantity and soil moisture is a concern.

**After Situation:**

Plastic mulch is applied in rows with a mulch layer or by other mechanized means. Soil moisture is conserved and energy use associated with irrigation is decreased.

**Feature Measure:** Area Covered by Mulch

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 17,424.0

**Scenario Total Cost:** $943.52

**Scenario Cost/Unit:** $0.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Mulch, polyethylene plastic, 1.0 mil | 1303 | 1.0 mil polyethylene plastic mulch, with anchoring. Includes materials and shipping only. | Square Yard | $0.37 | 1936 | $716.32 |

**Practice:** 484 - Mulching

**Scenario** #6 - Geotextile

**Scenario Description:**

Installation of geotextile or other fabric mulch to conserve soil moisture, moderate soil temperature, and/or provide erosion control. Typically used around new tree and shrub plantings (9 sqft / tree) or along vineyard rows. Payment based on actual area covered by mulching material.

**Before Situation:**

Site conditions vary. Typically scenarios include new tree and shrub plantings, irrigated orchards or vineyards, or annual and perennial specialty crops. Water quantity and soil moisture is a concern.

**After Situation:**

Synthetic mulch is applied in rows with a mulch layer or by other mechanized means. Soil moisture is conserved, energy use associated with irrigation is decreased.

**Feature Measure:** Area Covered by Mulch

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 17,424.0

**Scenario Total Cost:** $4,936.80

**Scenario Cost/Unit:** $0.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 1936 | $4,936.80 |

**Practice:** 484 - Mulching

**Scenario** #48 - Tree and Shrub

**Scenario Description:**

Weed barrier fabric or other suitable natural or synthetic mulch is installed with a new tree and shrub planting. Typically used to prevent weed competition during the installation of conservation practices. Rate is per tree/shrub and assumes 1 square yard of weed barrier fabric and 5 staples/tree.

**Before Situation:**

Site conditions vary. Typical scenario is an installation of 100 native trees and shrubs to enhance wildlife habitat. Sites are often remote and trees may not be planted in rows, requiring each tree to be mulched individually

**After Situation:**

Implementation Requirements are prepared according to the 484 Mulching Standard and implemented. Weed barrier fabric squares are installed with 5 sod staples each, around individual trees and shrubs to control weed competition. Weeds are controlled and tree/shrub growth is minimally influenced by weed competition.

**Feature Measure:** Number of Trees Mulched

**Scenario Unit::** Each

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $255.00

**Scenario Cost/Unit:** $2.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 100 | $255.00 |

**Practice:** 484 - Mulching

**Scenario** #49 - Natural Materials, Heavy

**Scenario Description:**

Typical use is a heavy application of a state approved natural material that provides 100% soil coverage (approximately 3-4 T/ac or 3-4 inch depth when using straw). The purpose is to moderate soil temperature and/or improve soil quality if Soil Condition Index specifies this rate. Area of mulch may be concentrated in strips in orchard/vineyards or portions of fields used for row crops. Payment based on actual acres mulched.

**Before Situation:**

Site conditions vary. Typical scenario ranges from a 0.1 to 1.0 acre site with application around new tree and shrub plantings, on irrigated orchards or vineyards, or annual and perennial specialty crops. Moderation of soil temperature water quantity, soil health or soil moisture is a concern.

**After Situation:**

Natural mulch is applied in rows. Soil temperature is reduced, soil moisture is conserved, energy use associated with irrigation is decreased and erosion is reduced.

**Feature Measure:** Total Acres Mulched

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $847.70

**Scenario Cost/Unit:** $847.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 5 | $106.95 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| **Materials** | | | | | | |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $130.50 | 3.5 | $456.75 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #1 - Mechanical, Shredding, Light vegetation

**Scenario Description:**

This practice involves the use of medium to heavy machinery to clear above ground vegetation typically consisting of shrub dominated plant communities and small diameter trees to improve site conditions for establishing trees and/or shrubs. Typical sites include burned over or cut over forestlands where natural seed sources have been lost and the site captured by undesirable plant communities. This following resource concerns: soil quality degradation - compaction, soil erosion - sheet and rill, and degraded plant condition - undesirable plant productivity and health and inadequate structure and composition.

**Before Situation:**

Undesirable vegetation is present on the site including shrub dominated plant communities and small diameter trees. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs. Soils are compacted as a result of harvesting heavy equipment activities or other land uses.

**After Situation:**

Undesirable vegetation has been removed using a shredding powerhead on a high flow skidsteer or articulating loader. Undesirable vegetation is reduced to levels which favor establishment of desirable tree or shrub species. Woody residues mitigate soil erosion, delay establishment of herbaceous species, and conserve soil moisture in the unit. The typical size of the practice is 40 acres.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $27,439.98

**Scenario Cost/Unit:** $686.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 200 | $17,316.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 22 | $624.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 210 | $8,433.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 12 | $567.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #2 - Mechanical, Shredding, Heavy vegetation

**Scenario Description:**

This practice involves the use of heavy machinery to treat an area dominated by significant amounts of woody vegetation (trees and brush) and woody debris onsite. Treatment will improve site conditions for establishing trees and/or shrubs. Typical sites include trees and brush cover that is not appropriate to the site or providing the desired condition for the landowner. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition and soil quality degradation - soil erosion - sheet and rill.

**Before Situation:**

The site is dominated by undesirable vegetation including herbaceous plants and significant amounts of woody vegetation (trees and brush) occupying the site. There is also a significant component of woody debris onsite. Noxious and invasive species may also be present on the site. Vegetation densities and lack of natural seed sources prevent regeneration of desirable species. Soil erosion is above acceptable levels following fire occurrence.

**After Situation:**

Undesirable vegetation has been removed using a shredding powerhead on a high flow hydraulic excavator/ feller buncher, reducing competition for target trees and/or shrubs. Woody debris has been removed or modified to facilitate tree/shrub planting operations. Woody residues mitigate soil erosion, delay establishment of herbaceous species, and conserve soil moisture in the unit. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 40 acres.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $42,240.52

**Scenario Cost/Unit:** $1,056.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 200 | $32,288.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 210 | $8,433.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 12 | $567.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #3 - Mechanical, Brush Rake

**Scenario Description:**

This practice involves the use of a brush rake to treat an area in order to improve site conditions for establishing trees and/or shrubs. Slope, soil, and precipitation attributes allow for lower residual organic matter cover. Typical sites include trees and brush cover that are not appropriate to the site or providing the desired condition for the landowner. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health, inadequate structure and composition, wildfire hazard, and soil quality degradation - soil erosion - sheet and rill.

**Before Situation:**

Plant community management attributes or current fuel loading concerns would be best addressed by higher rates of residue as opposed to residue modification. Vegetation densities and lack of natural seed sources prevent regeneration of desirable species.

**After Situation:**

Undesirable vegetation has been removed using a brush rake. Woody debris has been removed or modified to facilitate tree/shrub planting operations. Conditions favor the establishment of desirable species. Soil erosion is mitigated through woody debris retention during raking operations. The typical size is 40 acres.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $18,111.52

**Scenario Cost/Unit:** $452.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 100 | $12,175.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 110 | $4,417.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 12 | $567.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #4 - Chemical, Ground Application

**Scenario Description:**

This practice involves the use of various herbicides applied using ground-based machinery (and some hack-n-squirt treatment of select trees) in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs. Typical sites include abandoned fields, pastures, rangelands, agricultural fields or forestland that was recently harvested. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition.

**Before Situation:**

Undesirable vegetation is present on the site including herbaceous plants and woody vegetation. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

**After Situation:**

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size of the practice is 40 acres.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $8,709.85

**Scenario Cost/Unit:** $217.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 26 | $1,656.46 |
| Chemical, ground application, wildland | 1313 | Chemical application performed by ground equipment. Includes forestry application methods that include heavy equipment such as skidders. Includes material, equipment, power unit and labor costs. | Acre | $114.79 | 40 | $4,591.60 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 26 | $1,228.50 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 40 | $754.80 |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $44.20 | 4 | $176.80 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 40 | $52.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #6 - Chemical, Hand Application

**Scenario Description:**

This practice involves the use of various herbicides applied using backpack sprayer or similar equipment, and hack-n-squirt for tree control, in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs. Typical sites include lands such as old fields, pastures, rangelands, agricultural fields, previous forestlands that have been abandoned and are now covered with a mixture of grasses, forbs, shrubs and some remnant trees. Resource concerns are: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition.

**Before Situation:**

Undesirable vegetation, including woody and herbaceous plants, occupy 100% of the site. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

**After Situation:**

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size of the practice is 40 acres.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $5,656.66

**Scenario Cost/Unit:** $141.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 44 | $2,803.24 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 4 | $111.04 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 24 | $1,134.00 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 40 | $1,513.20 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 40 | $52.40 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #7 - Hand Site Prep, Individual Spots, Light Vegetation

**Scenario Description:**

This practice typically involves hand grubbing all vegetation from individual spots (roughly 4-8 sqft) leaving bare soil where trees and/or shrubs will be planted with approximate density of 300 trees per acre. Typical sites are in upland settings with light to medium herbaceous vegetation. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure.

**Before Situation:**

The site contains undesirable vegetation including herbaceous and woody plants. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs. Soils are compacted as a result of recent timber harvesting activities or other land uses. If left untreated poor survival or reduced growth of trees/shrubs will occur and wildlife habitat conditions will not improve.

**After Situation:**

All undesirable vegetation has been grubbed out of a 3' x 3' area, leaving bare soil, at each planting spot. Tree seedlings and/or shrubs will be planted at each spot. Adequate moisture, space and light is available allowing plants to grow properly. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 10 acres; 300 spots per acre.

**Feature Measure:** Area of field where spots are creat

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,782.45

**Scenario Cost/Unit:** $278.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 83 | $2,357.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 9 | $425.25 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #8 - Hand Site Prep, Individual Spots, Thick Vegetation

**Scenario Description:**

This practice typically involves cutting and grubbing all vegetation from individual spots (roughly 4-8 sqft) leaving bare soil where trees and/or shrubs will be planted (300-600 trees per acre). Typical sites include riparian areas, wetlands, or other areas that include thick herbaceous mixed with woody vegetation and where use of chemicals is not desirable. Resource concerns addressed: degraded plant condition - undesirable plant productivity and health and inadequate structure.

**Before Situation:**

The site contains undesirable vegetation including herbaceous and woody plants. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

**After Situation:**

All undesirable vegetation has been grubbed out of a 3' x 3' area, leaving bare soil, at each planting spot. Tree seedlings and/or shrubs will be planted at each spot. Adequate moisture, space and light is available allowing plants to grow properly. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 1 acre; approximately 300-600 trees per acre.

**Feature Measure:** Area of field where spots are creat

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $983.95

**Scenario Cost/Unit:** $983.95

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 23 | $653.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 7 | $330.75 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #9 - Hand Site Prep, Individual Spots, Woody, Wet

**Scenario Description:**

This practice typically involves hand-cutting woody vegetation and grubbing all vegetation from individual spots (roughly 4-8 sqft) leaving bare soil where trees and/or shrubs will be planted (300-600 trees per acre). Typical sites include riparian areas, wetlands, or other sensitive areas dominated by thick woody vegetation and where use of chemicals is not desirable. Resource concerns addressed: degraded plant condition - undesirable plant productivity and health and inadequate structure.

**Before Situation:**

The site is in wet or sensitive areas where mechanical equipment would cause harm to site. It contains undesirable vegetation including mostly woody plants. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

**After Situation:**

All undesirable vegetation has been cut and grubbed out of a 3' x 3' area, leaving bare soil, at each planting spot. Tree seedlings and/or shrubs will be planted at each spot. Adequate moisture, space and light is available allowing plants to grow properly. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 1 acre; approximately 300-600 trees per acre.

**Feature Measure:** Area of field where spots are creat

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,689.83

**Scenario Cost/Unit:** $1,689.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 20 | $85.80 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 9 | $425.25 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #10 - Hand Site Prep, Individual Spots, Disaster Rehabilitation

**Scenario Description:**

This practice typically involves cutting and grubbing all vegetation from individual spots (roughly 4-8 sqft) leaving bare soil where trees and/or shrubs will be planted (300-600 trees per acre). Typical sites include emergent brush areas growing back after fire or other destructive event. Sites often have burnt or downed wood that requires clearing. A combination of mechanical and chemical methods may be used. Resource concerns addressed: degraded plant condition - undesirable plant productivity and health and inadequate structure.

**Before Situation:**

The site contains undesirable vegetation including herbaceous and woody plants. Noxious and invasive species are actively invading the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

**After Situation:**

All undesirable vegetation has been grubbed out of a 3' x 3' area, leaving bare soil, at each planting spot. Tree seedlings and/or shrubs will be planted at each spot. Adequate moisture, space and light is available allowing plants to grow properly. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 10 acre; approximately 300-600 trees per acre.

**Feature Measure:** Area of field where spots are creat

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,657.72

**Scenario Cost/Unit:** $565.77

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $307.21 | 8 | $2,457.68 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 2 | $40.32 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 40 | $2,548.40 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 3 | $56.61 |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 2 | $75.66 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 5 | $6.55 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #11 - Windbreak/Hedgerow

**Scenario Description:**

This practice involves the use of various chemical and/or tillage methods to allow for the planting of a windbreak or hedgerow. Site preparation includes chemically killing vegetation prior to mechanical site preparation that includes appropriate methods to allow for planting of the site which may include one or all of the following, ripping, disking, and harrowing. This practice may be applied on all lands needing treatment to facilitate establishment of trees and/or shrubs to facilitate establishment of a windbreak or hedgerow. Typical sites include open land such as old fields, pastures, rangelands and agricultural fields. Associated practices: Windbreak/Shelterbelt Establishment (380); Hedgerows (422). Resource concerns addressed: Soil erosion-wind; inadequate wildlife habitat; air quality-odors, chemical drift.

**Before Situation:**

Undesirable vegetation, including woody and herbaceous plants, is present on the site. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs. Soil is compacted as a result of prior land management activities.

**After Situation:**

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 1.5 acres.

**Feature Measure:** Area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $380.93

**Scenario Cost/Unit:** $380.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #12 - Windbreak/Hedgerow, Small Project, <=0.7 ac

**Scenario Description:**

This practice involves the use of various tillage methods, and/or chemicals, to allow for planting very small areas (0.7 ac or less) of shrubs and trees for hedgerows or windbreaks. Site preparation may include such implements as ripping, disking, harrowing, etc. This practice may be applied on all lands needing treatment to facilitate establishment of trees and/or shrubs. Typical sites include open land such as old fields, pastures, rangelands and agricultural fields. Could be used for organic operations. Associated practices: Windbreak/Shelterbelt Establishment (380); Hedgerows (422). Resource concerns addressed: Soil erosion-wind; inadequate wildlife habitat; air quality-odors, chemical drift. Resource concerns: Soil erosion (wind) and improvement of wildlife habitat.

**Before Situation:**

Undesirable vegetation, including woody and herbaceous plants, is present on the site. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs. Soil may be compacted as a result of prior land management activities.

**After Situation:**

Undesirable vegetation has been treated reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. Size is typically is less than 0.7 acre or less.

**Feature Measure:** Area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $362.36

**Scenario Cost/Unit:** #Div/0!

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 0.5 | $5.47 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 0.5 | $3.01 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 0.5 | $9.44 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 0.5 | $0.66 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 500 - Obstruction Removal

**Scenario** #1 - Removal and Disposal of Brush and Trees < 6 inch Diameter

**Scenario Description:**

Remove and disposal of brush and trees < 6 inches in diameter by demolition, excavation or other means required for removal. Dispose of all brush and trees so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all brush and trees by removal to an approved landfill, wood chipping and or land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of brush and trees in order to apply conservation practices or facilitate the planned land use. Brush and tree removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

**Before Situation:**

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The typical area will be a 2.0 acre impaired area. The removal of brush and trees < 6 inch diameter will be performed with the use of equipment and hand labor. Dispose of all brush and trees from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

**Feature Measure:** Land Area

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $2,317.93

**Scenario Cost/Unit:** $1,158.97

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 8 | $974.00 |
| Brush Chipper, 6" capacity | 938 | Brush Chipper, 6" capacity, typically 35 HP. Includes chipper and power unit. Labor not included. | Hour | $20.86 | 8 | $166.88 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 500 - Obstruction Removal

**Scenario** #2 - Removal and Disposal of Brush and Trees > 6 inch Diameter

**Scenario Description:**

Remove and disposal of brush and trees > 6 inches in diameter by demolition, excavation or other means required for removal. Dispose of all brush and trees so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all brush and trees by removal to an approved landfill, wood chipping and or land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of brush and trees in order to apply conservation practices or facilitate the planned land use. Brush and tree removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

**Before Situation:**

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The typical area will be a 2.0 acre impaired area. The removal of brush and trees > 6 inch diameter will be performed with the use of equipment and hand labor. Dispose of all brush and trees from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

**Feature Measure:** Land Area

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $4,603.32

**Scenario Cost/Unit:** $2,301.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 12 | $2,287.08 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 12 | $256.68 |
| Brush Chipper, 15" capacity | 1868 | Brush Chipper, 15" capacity, typically 165 HP. Includes chipper and power unit. Does not include labor. | Hour | $64.01 | 12 | $768.12 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 12 | $468.72 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 12 | $481.92 |

**Practice:** 500 - Obstruction Removal

**Scenario** #3 - Removal and Disposal of Fence

**Scenario Description:**

Remove and disposal of all existing fences by demolition, excavation or other means required for removal. Dispose of all fence materials from the site so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all materials by removal to an approved landfill, wood chipping and land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of the unwanted fence obstruction in order to apply conservation practices such as Upland Wildlife Habitat Management (645) or facilitate the planned land use. Fence removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment and reduce hazards to wildlife.

**Before Situation:**

On any land where existing fence interferes with planned land use development, public safety, wildlife movement and habitat, or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The typical fence will be 2640 in linear feet. The removal of the fence will be performed with the use of equipment and hand labor. Dispose of all debris from the fence removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape such as Upland Wildlife Habitat Management (645).

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,640.0

**Scenario Total Cost:** $2,663.09

**Scenario Cost/Unit:** $1.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 20 | $875.60 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 20 | $427.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 20 | $542.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 500 - Obstruction Removal

**Scenario** #4 - Removal and Disposal of Rock and or Boulders

**Scenario Description:**

Remove and disposal of rock and or boulders by drilling, blasting, demolition, excavation or other means required for removal. Dispose of all rocks and or boulders so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all rock and or boulders by removal to an approved location, or reuse location. Remove and dispose all rock and or boulders in order to apply conservation practices or facilitate the planned land use. Rocks and or boulders will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

**Before Situation:**

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The typical area will be a 5.0 acre impaired area. The removal of rock and or boulders will be performed by drilling, blasting, demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all rocks and boulders from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

**Feature Measure:** Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $72,157.50

**Scenario Cost/Unit:** $144.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 250 | $15,397.50 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $119.42 | 250 | $29,855.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 250 | $9,765.00 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 250 | $7,100.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 250 | $10,040.00 |

**Practice:** 500 - Obstruction Removal

**Scenario** #5 - Removal and Disposal of Steel and or Concrete Structures

**Scenario Description:**

Remove and disposal of steel and or concrete structures by demolition, excavation or other means required for removal. Dispose of all steel and or concrete structures so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all steel and or concrete structures by removal to an approved location, or reuse location. Remove and dispose all steel and or concrete structures in order to apply conservation practices or facilitate the planned land use. Steel and or concrete structure removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

**Before Situation:**

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The typical area will be a 2000 square feet of impaired land. The removal of steel and or concrete structures will be performed by demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all steel and or concrete structures from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

**Feature Measure:** Land Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $32,107.74

**Scenario Cost/Unit:** $16.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 67 | $12,769.53 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 67 | $4,126.53 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $119.42 | 67 | $8,001.14 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 67 | $2,617.02 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 67 | $1,902.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 67 | $2,690.72 |

**Practice:** 500 - Obstruction Removal

**Scenario** #6 - Removal and Disposal of Wood Structures

**Scenario Description:**

Remove and disposal of wood structures by demolition, excavation or other means required for removal. Dispose of all wood structures so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all wood structures by removal to an approved location, landfill, or reuse location. Remove and dispose all wood structures in order to apply conservation practices or facilitate the planned land use. Wood structure removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

**Before Situation:**

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The typical area will be a 2000 square feet of impaired land. The removal of wood structures will be performed by demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all wood structures from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

**Feature Measure:** Land Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $15,335.04

**Scenario Cost/Unit:** $7.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 32 | $6,098.88 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 32 | $1,970.88 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $119.42 | 32 | $3,821.44 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 32 | $1,249.92 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 32 | $1,285.12 |

**Practice:** 511 - Forage Harvest Management

**Scenario** #2 - Weed and Pest Control

**Scenario Description:**

Harvesting forages to optimize forage quality. Examples include preemptive harvest of forage crops to prevent damage from insects (such as leafhopper on alfalfa) or other pests; altering harvest schedule or height to control invasive weeds; altering frequency of harvest to reduce weed competition or pest populations. Also may be applied in transition to organic operations or to adjust feeding rotations developed in a management plan.

**Before Situation:**

Forage pests and weeds are usually controlled with pesticides and herbicides. Harvest schedules promote invasive weeds and support pests.

**After Situation:**

Forage pests are controlled by executing a preemptive harvest before pests can damage forage quality. Forage yields are reduced because of immature stage of forage growth. Forage tests are submitted to an accredited lab for analysis. Records of forage quality components are used to adjust feeding rations.

**Feature Measure:** Relative Feed Value Maintained

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $413.51

**Scenario Cost/Unit:** $10.34

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 7 | $273.42 |
| **Materials** | | | | | | |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $25.03 | 3 | $75.09 |

**Practice:** 511 - Forage Harvest Management

**Scenario** #3 - Delayed Harvest, Single Crop

**Scenario Description:**

In perennial forage crops, the delaying the harvest of forages to promote wildlife, such as the reproduction of ground nesting birds or skipping the last cutting to leave forage for wintering wildlife. Delaying the harvest of the first cutting will benefit species such as ground nesting birds The delayed harvest results in a decrease in overall forage quality and/or quantity. The selected fields should be large enough to promote ground nesting birds. After young have fledged the field will be harvested for forages. Use state guidance for target nesting dates.

**Before Situation:**

Forage crops, (typically perennial) are produced and harvested; ground nesting birds are disturbed and/or fledgling birds are killed in the process, or no excess forage is available for winter forage.

**After Situation:**

Forage crop harvest is delayed; forage quality is compromised, however, the survival of ground nesting birds or other wildlife is promoted.

**Feature Measure:** Increased grassland bird populatio

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $1,789.99

**Scenario Cost/Unit:** $44.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 119 | $1,532.72 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 3 | $117.18 |
| **Materials** | | | | | | |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $25.03 | 3 | $75.09 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #1 - Non-Native Standard Seeding with Fertilizer

**Scenario Description:**

The field is seeded to herbaceous cover, consisting of a mixture of non-native species for pasture, hay or biomass production. The standard low seeding rate is typically used in areas of lower precipitation or other sites where moisture or other site conditions are limiting. Standard rate is typically in the vicinity of 9 lb/acre PLS (Pure Live Seed). Resource concerns addressed: improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or produce feedstock for biofuel or energy production. The practice applies to all lands suitable to the establishment of species for forage or biomass production, but not to the establishment of annually planted and harvested food, fiber or oilseed crops.

**Before Situation:**

Poor or nonexistent stand of desired herbaceous species. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable species are established to improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or produce feedstock for biofuel or energy production. The typical size of the practice is 30 acres.

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $5,681.41

**Scenario Cost/Unit:** $189.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 60 | $656.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 30 | $180.60 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 30 | $195.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 30 | $629.10 |
| **Materials** | | | | | | |
| Nitrogen (N), Ammonium Nitrate | 69 | Price per pound of N supplied by Ammonium Nitrate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.61 | 1200 | $732.00 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 1500 | $675.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 1500 | $600.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 1 | $10.21 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 30 | $566.10 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 30 | $1,437.00 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #2 - Non-Native Standard Seeding no Fertilizer

**Scenario Description:**

The field is seeded to herbaceous cover, consisting of a mixture of non-native species for pasture, hay or biomass production. The standard low seeding rate is typically used in areas of lower precipitation or other sites where moisture or other site conditions are limiting. Standard rate is typically in the vicinity of 9 lb/acre PLS (Pure Live Seed). Resource concerns addressed: improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or produce feedstock for biofuel or energy production. The practice applies to all lands suitable to the establishment of species for forage or biomass production, but not to the establishment of annually planted and harvested food, fiber or oilseed crops.

**Before Situation:**

Poor or nonexistent stand desired of herbaceous species. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable species are established to improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or produce feedstock for biofuel or energy production. The typical size of the practice is 30 acres.

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $3,479.41

**Scenario Cost/Unit:** $115.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 60 | $656.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 30 | $180.60 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 30 | $629.10 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 1 | $10.21 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 30 | $566.10 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 30 | $1,437.00 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #3 - Nonnative High Seeding Rate no Lime

**Scenario Description:**

The field is seeded to herbaceous cover, consisting of a mixture of non-native species for pasture, hay or biomass production. The high seeding rate is used in areas of higher precipitation or on irrigated fields where moisture or other site conditions are not limiting. The high rate is typically in the vicinity of 30 lb/acre PLS (Pure Live Seed). Higher seeding rates account for seed losses to causes such as increased density of predators or moisture conditions which may cause seed to rot before sprouting. Since moisture is not limiting, a higher density of desirable seedlings also offers greater competition to weed seedlings without significant adverse effects to the planted species. Resource concerns addressed: improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or produce feedstock for biofuel or energy production. The practice applies to all lands suitable to the establishment of species for forage or biomass production, but not to the establishment of annually planted and harvested food, fiber or oilseed crops. Results of a soil test DO NOT show the need for lime or similar soil amendments.

**Before Situation:**

Poor or nonexistent stand of desired herbaceous species. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable species are established to improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or produce feedstock for biofuel or energy production. The typical size of the practice is 30 acres.

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $7,865.11

**Scenario Cost/Unit:** $262.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 60 | $656.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 60 | $361.20 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 30 | $195.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 30 | $629.10 |
| **Materials** | | | | | | |
| Nitrogen (N), Ammonium Nitrate | 69 | Price per pound of N supplied by Ammonium Nitrate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.61 | 1200 | $732.00 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 1500 | $675.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 1500 | $600.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 1 | $10.21 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 60 | $1,132.20 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 60 | $2,874.00 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #4 - Nonnative, High Seeding Rate with Lime or similar amendment

**Scenario Description:**

The field is seeded to herbaceous cover, consisting of a mixture of non-native species for pasture, hay or biomass production. Soil tests show the need for lime or similar soil amendments. The high seeding rate is used in areas of higher precipitation or on irrigated fields where moisture or other site conditions are not limiting. The high rate is typically in the vicinity of 30 lb/acre PLS (Pure Live Seed). Higher seeding rates account for seed losses to causes such as increased density of predators or moisture conditions which may cause seed to rot before sprouting. Since moisture is not limiting, a higher density of desirable seedlings also offers greater competition to weed seedlings without significant adverse effects to the planted species. Resource concerns addressed: improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or produce feedstock for biofuel or energy production. The practice applies to all lands suitable to the establishment of species for forage or biomass production, but not to the establishment of annually planted and harvested food, fiber or oilseed crops.

**Before Situation:**

Poor or nonexistent stand of desired herbaceous species. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable species are established to improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or produce feedstock for biofuel or energy production. The typical size of the practice is 30 acres.

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $10,511.11

**Scenario Cost/Unit:** $350.37

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 60 | $656.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 60 | $361.20 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 30 | $195.00 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 30 | $313.20 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 30 | $629.10 |
| **Materials** | | | | | | |
| Nitrogen (N), Ammonium Nitrate | 69 | Price per pound of N supplied by Ammonium Nitrate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.61 | 1200 | $732.00 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 1500 | $675.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 1500 | $600.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 60 | $2,332.80 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 1 | $10.21 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 60 | $1,132.20 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 60 | $2,874.00 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #6 - Small Acreage Nonnative High Seeding Rate no Lime

**Scenario Description:**

The small acreage field (typically 1 to 10 acres) is seeded to herbaceous cover, consisting of a mixture of non-native species for pasture, hay or biomass production. The high seeding rate is used in areas of higher precipitation or on irrigated fields where moisture or other site conditions are not limiting. The high rate is typically in the vicinity of 30 lb/acre PLS (Pure Live Seed). Higher seeding rates account for seed losses to causes such as increased density of predators or moisture conditions which may cause seed to rot before sprouting. Since moisture is not limiting, a higher density of desirable seedlings also offers greater competition to weed seedlings without significant adverse effects to the planted species. The small acreage is broadcast seeded. Resource concerns addressed: improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or produce feedstock for biofuel or energy production. The practice applies to all lands suitable to the establishment of species for forage or biomass production, but not to the establishment of annually planted and harvested food, fiber or oilseed crops. Results of a soil test DO NOT show the need for lime or similar soil amendments.

**Before Situation:**

Poor or nonexistent stand of desired herbaceous species. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable species are established to improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or produce feedstock for biofuel or energy production. The typical size of the practice is 30 acres.

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $2,114.05

**Scenario Cost/Unit:** $422.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 20 | $218.80 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 10 | $60.20 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 5 | $32.50 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 5 | $61.85 |
| **Materials** | | | | | | |
| Nitrogen (N), Ammonium Nitrate | 69 | Price per pound of N supplied by Ammonium Nitrate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.61 | 200 | $122.00 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 250 | $112.50 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 250 | $100.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 1 | $10.21 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 10 | $188.70 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 20 | $958.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #1 - PVC (Iron Pipe Size)

**Scenario Description:**

Description: Below-ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 1-inch to 4-inch Appurtenances include couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities for use by livestock or wildlife. Typical scenario size is 1½-inch. Construct one mile (5,280 feet) of 1½-inch, Schedule 40, PVC Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. The scenario unit is length of pipe material in feet. 5,280 feet of 1½-inch, Schedule 40, PVC pipe weighs 0.501 lb/ft, or a total of 2,645 pounds.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 5,280.0

**Scenario Total Cost:** $14,891.68

**Scenario Cost/Unit:** $2.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 5280 | $7,180.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 2910 | $5,849.10 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #2 - PVC (Iron Pipe Size) Difficult install

**Scenario Description:**

Description: Below-ground installation of PVC (Iron Pipe Size) pipeline in difficult or rocky terrain. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 1-inch to 4-inch; and typical scenario size is 1½-inch. Construct one mile (5,280 feet) of 1½-inch, Schedule 40, PVC Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. The scenario unit is length of pipe material in feet. 5,280 feet of 1½-inch, Schedule 40, PVC pipe weighs 0.501 lb/ft, or a total of 2,645 pounds. Appurtenances include couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 5,280.0

**Scenario Total Cost:** $29,544.28

**Scenario Cost/Unit:** $5.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 3130 | $15,337.00 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 3130 | $5,133.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 96 | $2,726.40 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 2910 | $5,849.10 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #3 - HDPE (Iron Pipe Size & Tubing)

**Scenario Description:**

Description: Below-ground installation of HDPE (Iron Pipe Size & Tubing) pipeline. HDPE (IPS &Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; typical practice sizes range from 1-inch to 4-inch; and typical scenario size is 1½-inch. Construct one mile (5,280 feet) of 1½-inch, Class 200 (SDR-9.0, PE4708), HDPE Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. Typical size range of pipe installed: 1-inch to 4-inch. The scenario unit is length of pipe material in feet. 5,280 feet of 1½-inch, Class 200 (SDR-9.0, PE4708), HDPE pipe weighs 0.475 lb/ft, or a total of 2,508 pounds. Appurtenances include fittings, anchors, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 5,280.0

**Scenario Total Cost:** $13,956.20

**Scenario Cost/Unit:** $2.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Pipeline Plowing | 1096 | Includes equipment and labor for plowing small diameter lines in common earth (< 3") | Foot | $1.09 | 5280 | $5,755.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 2759 | $6,566.42 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #4 - HDPE (Iron Pipe Size & Tubing) Difficult install

**Scenario Description:**

Description: Below-ground installation of HDPE (Iron Pipe Size & Tubing) pipeline in difficult or rocky terrain. HDPE (IPS &Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; typical practice sizes range from 1-inch to 4-inch; and typical scenario size is 1½-inch. Construct one mile (5,280 feet) of 1½-inch, Class 200 (SDR-9.0, PE4708), HDPE Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. Typical size range of pipe installed: 1-inch to 4-inch. The scenario unit is length of pipe material in feet. 5,280 feet of 1½-inch, Class 200 (SDR-9.0, PE4708), HDPE pipe weighs 0.475 lb/ft, or a total of 2,508 pounds. Appurtenances include fittings, anchors, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 5,280.0

**Scenario Total Cost:** $29,807.20

**Scenario Cost/Unit:** $5.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 3130 | $15,337.00 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 3130 | $5,133.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 2759 | $6,566.42 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #5 - Surface HDPE (Iron Pipe Size & Tubing)

**Scenario Description:**

Description: on-ground surface installation of HDPE (Iron Pipe Size & Tubing) pipeline. HDPE (IPS & Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; typical practice sizes range from 1-inch to 4-inch; and typical scenario size is 1½-inch. Construct one mile (5,280 feet) of 1½-inch, Class 200 (SDR-9.0, PE4708), HDPE Pipeline with appurtenances, installed on the ground surface. Typical size range of pipe installed: 1-inch to 4-inch. The scenario unit is length of pipe material in feet. 5,280 feet of 1½-inch, Class 200 (SDR-9.0, PE4708), HDPE pipe weighs 0.475 lb/ft, or a total of 2,508 pounds. Appurtenances include couplings, fittings, anchors, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 15% of pipe material quantity). Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 5,280.0

**Scenario Total Cost:** $8,195.20

**Scenario Cost/Unit:** $1.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 8 | $195.28 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 2884 | $6,863.92 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #6 - Steel (Iron Pipe Size)

**Scenario Description:**

Description: Below-ground installation of Steel (Iron Pipe Size) pipeline. Steel (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 1-inch to 4-inch; and typical scenario size is 1½-inch. Construct one mile (5,280 feet) of 1½-inch, Schedule 40, Galvanized Steel Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. Typical size range of pipe installed: 1-inch to 4-inch. The scenario unit is length of pipe material in feet. 5,280 feet of 1½-inch, Schedule 40, Galvanized Steel Pipe weighs 2.718 lb/ft, or a total of 14,351 pounds. Appurtenances include couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 5,280.0

**Scenario Total Cost:** $38,131.60

**Scenario Cost/Unit:** $7.22

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 5280 | $7,180.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 144 | $4,089.60 |
| **Materials** | | | | | | |
| Pipe, steel, smooth wall, galvanized, weight priced | 1381 | Steel manufactured into galvanized smooth wall pipe | Pound | $1.67 | 15786 | $26,362.62 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #7 - Steel (Iron Pipe Size) Difficult Install

**Scenario Description:**

Description: Below-ground installation of Steel (Iron Pipe Size) pipeline in difficult or rocky terrain. Steel (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 1-inch to 4-inch; and typical scenario size is 1½-inch. Construct one mile (5,280 feet) of 1½-inch, Schedule 40, Galvanized Steel Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. Typical size range of pipe installed: 1-inch to 4-inch. The scenario unit is length of pipe material in feet. 5,280 feet of 1½-inch, Schedule 40, Galvanized Steel Pipe weighs 2.718 lb/ft, or a total of 14,351 pounds. Appurtenances include couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 5,280.0

**Scenario Total Cost:** $55,510.60

**Scenario Cost/Unit:** $10.51

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 3130 | $15,337.00 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 3130 | $5,133.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 288 | $8,179.20 |
| **Materials** | | | | | | |
| Pipe, steel, smooth wall, galvanized, weight priced | 1381 | Steel manufactured into galvanized smooth wall pipe | Pound | $1.67 | 15786 | $26,362.62 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #8 - Surface Steel (Iron Pipe Size)

**Scenario Description:**

Description: on-ground surface installation of Steel (Iron Pipe Size) pipeline. Steel (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 1-inch to 4-inch; and typical scenario size is 1½-inch. Construct one mile (5,280 feet) of 1½-inch, Schedule 40, Galvanized Steel Pipeline with appurtenances, installed on the ground surface. Typical size range of pipe installed: 1-inch to 4-inch. The scenario unit is length of pipe material in feet. 5,280 feet of 1½-inch, Schedule 40, Galvanized Steel Pipe weighs 2.718 lb/ft, or a total of 14,351 pounds. Appurtenances include couplings, fittings, expansion joints, anchors, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 15% of pipe material quantity). Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 5,280.0

**Scenario Total Cost:** $31,651.28

**Scenario Cost/Unit:** $5.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 144 | $4,089.60 |
| **Materials** | | | | | | |
| Pipe, steel, smooth wall, galvanized, weight priced | 1381 | Steel manufactured into galvanized smooth wall pipe | Pound | $1.67 | 16504 | $27,561.68 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #9 - PVC deep trench

**Scenario Description:**

Description: Below ground installation of PVC (Iron Pipe Size) pipeline deeper than a typical installation to ensure the pipe is kept below the frost line (typically 5' deep). PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 1-inch to 4-inch; and typical scenario size is 1½-inch. Construct one mile (5,280 feet) of 1½-inch, Schedule 40, PVC Pipeline with appurtenances, installed below ground. The scenario unit is length of pipe material in feet. 5,280 feet of 1½-inch, Schedule 40, PVC pipe weighs 0.501 lb/ft, or a total of 2,645 pounds. Appurtenances include couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 5,280.0

**Scenario Total Cost:** $40,091.28

**Scenario Cost/Unit:** $7.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 7825 | $19,093.00 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 7825 | $12,833.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 64 | $1,817.60 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 2910 | $5,849.10 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #10 - PVC, High Fitting Ratio

**Scenario Description:**

Description: Below-ground installation of PVC pipeline on a short section of pipeline with a high number of fittings. This scenario would be appropriate on sites where the number of elbows, risers, gate valves and other appurtenances would significantly increase the cost of the installation. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 1-inch to 4-inch. Appurtenances include couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 50% of pipe material quantity). Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities for use by livestock or wildlife. Typical scenario size is 1½-inch. Construct 2000 ft of 1½-inch, Schedule 40, PVC Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. The site and use require a large number of gate valves to control water direction and a large number of risers. The scenario unit is length of pipe material in feet. 2,000 feet of 1½-inch, Schedule 40, PVC pipe weighs 0.501 lb/ft plus an additional 50% for fittings and valves, or a total of 1,503 pounds.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $7,091.61

**Scenario Cost/Unit:** $3.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 2000 | $2,720.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 30 | $852.00 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 1503 | $3,021.03 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #68 - Directional drilling beneath roads or streams

**Scenario Description:**

Below ground installation of pipeline requiring directional drilling under a road or stream. Scenario covers excavation to place directional drill equipment, boring under road or stream and placement of 'sleeve pipe', placement of PVC pipe, all fittings, thrust blocks and appurtenances, backfill and final grading of the trench. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636)

**Before Situation:**

Fields on the far side of a stream or road are inaccessible for livestock or an above ground pipeline or temporary pipeline is used to cross a stream or a temporary pipeline is placed through a road culvert to cross a road.

**After Situation:**

Pipeline installed to convey and/or distribute water to storage and/or watering facilities for use by livestock, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is for boring 100' under a road with a 3" steel casing pipe and a 1.5" inner PVC pipe. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of PVC pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers.

**Feature Measure:** Length of boring

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $8,231.47

**Scenario Cost/Unit:** $82.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Horizontal Boring, Less Than Equal 3" diameter | 1131 | Includes equipment, labor and setup. | Foot | $55.65 | 100 | $5,565.00 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 60 | $146.40 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 60 | $98.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 60 | $120.60 |
| Pipe, steel, smooth wall, galvanized, weight priced | 1381 | Steel manufactured into galvanized smooth wall pipe | Pound | $1.67 | 760 | $1,269.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 520 - Pond Sealing or Lining, Compacted Soil Treatment

**Scenario** #20 - Soil Dispersant - Uncovered

**Scenario Description:**

Construction of a compacted soil liner, treated with a soil dispersant, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the dispersant with the soil liner under proper moisture conditions and compaction to the designed liner thickness. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Volume of Liner Material

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,613.0

**Scenario Total Cost:** $11,726.56

**Scenario Cost/Unit:** $7.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 1613 | $7,048.81 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 6 | $339.84 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Soil Dispersant | 1490 | Soil Amendment (tetrasodium pyrophosphate (TSPP), sodium tripolyphosphate (STPP), or soda ash or approved equivalent) | Ton | $500.26 | 6.53 | $3,266.70 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 1 | $1.02 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 520 - Pond Sealing or Lining, Compacted Soil Treatment

**Scenario** #21 - Soil Dispersant - Covered

**Scenario Description:**

Construction of a compacted soil liner, treated with a soil dispersant, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the dispersant with the soil liner under proper moisture conditions, compaction to the designed liner thickness, and placement of soil cover over the treated liner. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Volume of Liner Material including

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 3,226.0

**Scenario Total Cost:** $18,775.37

**Scenario Cost/Unit:** $5.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 3226 | $14,097.62 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 6 | $339.84 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Soil Dispersant | 1490 | Soil Amendment (tetrasodium pyrophosphate (TSPP), sodium tripolyphosphate (STPP), or soda ash or approved equivalent) | Ton | $500.26 | 6.53 | $3,266.70 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 1 | $1.02 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 520 - Pond Sealing or Lining, Compacted Soil Treatment

**Scenario** #22 - Bentonite Treatment - Uncovered

**Scenario Description:**

Construction of a compacted soil liner, treated with bentonite, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the bentonite with the soil under proper moisture conditions, compaction to the designed liner thickness. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Volume of Liner Material

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,613.0

**Scenario Total Cost:** $124,562.96

**Scenario Cost/Unit:** $77.22

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 1613 | $7,048.81 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 6 | $339.84 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 7 | $189.84 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |
| **Materials** | | | | | | |
| Bentonite | 41 | Bentonite, includes materials (50# bag) | Each | $22.25 | 5227 | $116,300.75 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 1 | $1.02 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 520 - Pond Sealing or Lining, Compacted Soil Treatment

**Scenario** #23 - Bentonite Treatment - Covered

**Scenario Description:**

Construction of a compacted soil liner, treated with bentonite, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the bentonite with the soil under proper moisture conditions, compaction to the designed liner thickness, and placement of soil cover over the treated liner. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with bentonite.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Volume of Liner Material (includes

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,613.0

**Scenario Total Cost:** $131,616.14

**Scenario Cost/Unit:** $81.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 3227 | $14,101.99 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 6 | $339.84 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 7 | $189.84 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |
| **Materials** | | | | | | |
| Bentonite | 41 | Bentonite, includes materials (50# bag) | Each | $22.25 | 5227 | $116,300.75 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 1 | $1.02 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 520 - Pond Sealing or Lining, Compacted Soil Treatment

**Scenario** #24 - Material haul < 1 mile

**Scenario Description:**

Construction of a compacted soil liner, treated with compacted clay, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the soil liner under proper moisture conditions to the designed liner thickness, and soil cover to protect the finished liner. Material haul < 1 mile. Associated practices include PS378, PS313, & other waste water impoundments.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits. An adequate quantity of soil suitable for constructing a clay liner without amendments is available at an economical haul distance. Material haul < 1 mile.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Volume of Liner Material (including

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,420.0

**Scenario Total Cost:** $27,143.24

**Scenario Cost/Unit:** $11.22

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 2420 | $10,575.40 |
| Excavation, clay, large equipment, 1500 ft | 1217 | Bulk excavation of clay with scrapers with average haul distance of 1500 feet. Includes equipment and labor. | Cubic Yard | $6.41 | 1613 | $10,339.33 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.68 | 807 | $2,969.76 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 14 | $1,581.58 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 3 | $1,427.88 |

**Practice:** 520 - Pond Sealing or Lining, Compacted Soil Treatment

**Scenario** #25 - Material haul > 1 mile

**Scenario Description:**

Construction of a compacted soil liner, treated with compacted clay, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the soil liner under proper moisture conditions to the designed liner thickness, and protection of the finished liner. Material haul > 1 mile. Associated practices include PS378, PS313, & other waste water impoundments.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits. An adequate quantity of soil suitable for constructing a clay liner without amendments is available at an economical haul distance.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Volume of Liner Material (including

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,420.0

**Scenario Total Cost:** $32,258.24

**Scenario Cost/Unit:** $13.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 2420 | $10,575.40 |
| Track Loader, 95HP | 935 | Equipment and power unit costs. Labor not included. | Hour | $86.55 | 20 | $1,731.00 |
| Excavation, clay, large equipment, 1500 ft | 1217 | Bulk excavation of clay with scrapers with average haul distance of 1500 feet. Includes equipment and labor. | Cubic Yard | $6.41 | 1613 | $10,339.33 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.68 | 807 | $2,969.76 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 8065 | $2,580.80 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 20 | $803.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 14 | $1,581.58 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 3 | $1,427.88 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #1 - Flexible Membrane, Uncovered, without liner drainage or venting

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes a geotextile or soil cushion to protect the liner from subgrade damage. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Surface area of Liner Material (incl

**Scenario Unit::** Square Yard

**Scenario Typical Size:** 2,420.0

**Scenario Total Cost:** $27,230.47

**Scenario Cost/Unit:** $11.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 2420 | $6,171.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 41 | $1,601.46 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 33 | $3,728.01 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.50 | 2420 | $15,730.00 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #2 - Flexible Membrane, Uncovered, with liner drainage or venting

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes a geotextile or soil cushion to protect the liner from subgrade damage, and liner drainage or venting. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Surface area of Liner Material (incl

**Scenario Unit::** Square Yard

**Scenario Typical Size:** 2,420.0

**Scenario Total Cost:** $35,264.87

**Scenario Cost/Unit:** $14.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 2420 | $6,171.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 41 | $1,601.46 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 33 | $3,728.01 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.50 | 2420 | $15,730.00 |
| Geonet | 1778 | Geosynthetic drainage liner, typically HDPE of 300 mil thickness. Includes materials and shipping only. | Square Yard | $3.32 | 2420 | $8,034.40 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #3 - Flexible Membrane, Covered, without liner drainage or venting

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes 1 foot of soil cover for liner protection, and a geotextile or soil cushion to protect liner from subgrade damage. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Surface area of Liner Material (incl

**Scenario Unit::** Square Yard

**Scenario Typical Size:** 2,420.0

**Scenario Total Cost:** $30,757.06

**Scenario Cost/Unit:** $12.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 2420 | $6,171.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 807 | $3,526.59 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 41 | $1,601.46 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 33 | $3,728.01 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.50 | 2420 | $15,730.00 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #4 - Flexible Membrane, Covered, with liner drainage or venting

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes 1 foot of soil cover for liner protection, a geotextile or soil cushion to protect liner from subgrade damage, and liner drainage or venting. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Surface area of Liner Material (incl

**Scenario Unit::** Square Yard

**Scenario Typical Size:** 2,420.0

**Scenario Total Cost:** $38,791.46

**Scenario Cost/Unit:** $16.03

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 2420 | $6,171.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 807 | $3,526.59 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 41 | $1,601.46 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 33 | $3,728.01 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.50 | 2420 | $15,730.00 |
| Geonet | 1778 | Geosynthetic drainage liner, typically HDPE of 300 mil thickness. Includes materials and shipping only. | Square Yard | $3.32 | 2420 | $8,034.40 |

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #5 - Double Flexible Membrane, with Geoweb and drain

**Scenario Description:**

Installation of a double flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes a geoweb/geonet structure encompassed by a membrane on top and bottom. A drain collects any seepage through the top layer and removes it through a drain system. Practice protects ground water from contamination. Practices meets Central Valley Regional Water Control Board water quality regulations for dairies. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibits seepage rates in excess of acceptable limits and site is in area likely to cause degradation to ground water resources.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Surface area of Liner Material (incl

**Scenario Unit::** Square Yard

**Scenario Typical Size:** 2,420.0

**Scenario Total Cost:** $48,878.70

**Scenario Cost/Unit:** $20.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 2420 | $6,171.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 30 | $1,650.90 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.50 | 4840 | $31,460.00 |
| Geonet | 1778 | Geosynthetic drainage liner, typically HDPE of 300 mil thickness. Includes materials and shipping only. | Square Yard | $3.32 | 2420 | $8,034.40 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #1 - Range Basic

**Scenario Description:**

Design and implementation of a grazing system that will enhance rangeland health and ecosystem function as well as optimize efficiency and economic return through monitoring (ex: photo points, stubble height after grazing, etc.) & record keeping.

**Before Situation:**

Current grazing system exhibits undesirable and inefficient use of forage plants and such use may have a negative impact on rangeland health, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

**After Situation:**

Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances rangeland health and function through protection of sensitive areas, and efficient harvest of forage resources. Grazing system success will be evaluated through monitoring of key grazing areas.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $1,990.96

**Scenario Cost/Unit:** $3.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 48 | $1,874.88 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #2 - Range, Intensive

**Scenario Description:**

Design and implementation of a grazing system that will enhance rangeland health and ecosystem function as well as optimize efficiency and economic return through monitoring (ex: trend, composition, utilization, production, etc.), record keeping and establishment of transects for long-term monitoring.

**Before Situation:**

Current grazing system exhibits undesirable and inefficient use of forage plants and such use may have a negative impact on rangeland health, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

**After Situation:**

Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances rangeland health and function through proper rest and recovery periods, protection of sensitive areas, proper utilization, and efficient harvest of forage resources. Grazing system success will be evaluated through establishment of transects for long term monitoring and monitoring of utilization.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $2,705.86

**Scenario Cost/Unit:** $5.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 60 | $2,343.60 |
| **Materials** | | | | | | |
| Nutritional Balance Analyzer, fecal sample analysis only | 1127 | NIRS fecal analysis, animal performance report. Includes materials and shipping only. | Each | $41.03 | 6 | $246.18 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #4 - Habitat Management, Intensive

**Scenario Description:**

Development and implementation of an adaptively managed grazing schedule that will enhance habitat components for the identified native species of concern. In order to achieve this, implementation of a rest/rotation, deferred or Management-intensive grazing system will be required. A portion of the acres (i.e. 20% for Sage Grouse Initiative) will be deferred during periods of critical periods for the native species of concern. Typically, a utilization map will be developed that covers the entire grazing unit.

**Before Situation:**

Wildlife cover, shelter, food, water or movement are limited due to grazingland condition. Plant health and vigor are negatively impacted by one or more of the following: poor grazing distribution, timing of grazing or inadequate rest and recovery periods. Water quality may be impacted by increased runoff and erosion. In addition reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

A grazing system is altered and/or enhanced to benefit habitat for targeted native species. Additional benefits may include improved rangeland and/or pasture health, adequate rest and recovery periods, protection of sensitive areas, improved water quality and reduced risk of invasive or noxious weed encroachment. A rest/rotation, deferred or Management-intensive grazing system has been implemented. A portion of the acres (i.e. 20% for Sage Grouse Initiative) is deferred during periods of critical periods for the native species of concern. Typically, a utilization map will be developed that covers the entire grazing unit.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $8,928.64

**Scenario Cost/Unit:** $8.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 80 | $1,711.20 |
| Trucking, moving livestock to new paddock | 961 | Livestock transportation costs to implement a grazing rotation using a gooseneck trailer 6'8" x 24'. Includes equipment, power unit and labor costs. | Mile | $4.36 | 400 | $1,744.00 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 33 | $425.04 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 80 | $3,124.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 16 | $1,807.52 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #5 - Pasture, Basic

**Scenario Description:**

Design and implement a grazing system that will enhance pasture condition and ecosystem function as well as optimize efficiency and economic return through monitoring (ex: photo points, stubble height after grazing, etc.) & record keeping.

**Before Situation:**

Current grazing system exhibits undesirable and inefficient use of forage plants and such use may have a negative impact on pasture condition, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape. Typical size of pastures is 30 acres.

**After Situation:**

Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through protection of sensitive areas, and efficient harvest of forage resources. Grazing system success will be evaluated through short term monitoring (ex: photo points showing species composition, forage production and utilization) and recordkeeping of grazing dates and stubble height after grazing by paddock, etc.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $1,366.00

**Scenario Cost/Unit:** $45.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 32 | $1,249.92 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #6 - Pasture, Intensive

**Scenario Description:**

Design and implementation of a grazing system that will enhance pasture condition and ecosystem function as well as optimize efficiency and economic return through monitoring (ex: trend, composition, utilization, production, etc.), record keeping and establishment of long-term monitoring areas. This scenario may also be used on vineyards and orchards for management of inter-row cover crops.

**Before Situation:**

Current grazing system exhibits undesirable and inefficient use of forage plants and such use may have a negative impact on pasture condition, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape. Typical size of pastures is 30 acres.

**After Situation:**

Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through proper rest and recovery periods, protection of sensitive areas, proper utilization, and efficient harvest of forage resources. Activities might include moving animals more frequently, subdivision of fields with temporary fencing, grazing fields at different times of year, developing watering areas to improve distribution, or seasonal deferment. Grazing system success will be evaluated through review of records (i.e. grazing dates and stubble heights by paddock, photo points and other measurements of trend, species composition, forage production and utilization) and establishment and monitoring of long term monitoring areas.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $2,237.14

**Scenario Cost/Unit:** $74.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 48 | $1,874.88 |
| **Materials** | | | | | | |
| Nutritional Balance Analyzer, fecal sample analysis only | 1127 | NIRS fecal analysis, animal performance report. Includes materials and shipping only. | Each | $41.03 | 6 | $246.18 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #7 - Pasture, Deferment

**Scenario Description:**

Defer the pasture for 90 days and up to a growing season to manage for invasive weeds when necessary, to improve the health of the plants and/or provide nesting habitat for wildlife species. Keep records of dates out and monitor to determine when desired objectives of deferment are met.

**Before Situation:**

Over-grazed pasture, a pasture with a low condition score, or a newly established pasture converted from cropland with a need for proper grazing management. Typical size of pastures is 30 acres.

**After Situation:**

Improve the health and vigor of the sward, through deferment of grazing and/or improve the nesting habitat for wildlife.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $1,867.88

**Scenario Cost/Unit:** $62.26

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Trucking, moving livestock to new paddock | 961 | Livestock transportation costs to implement a grazing rotation using a gooseneck trailer 6'8" x 24'. Includes equipment, power unit and labor costs. | Mile | $4.36 | 25 | $109.00 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 90 | $1,159.20 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #8 - Range, Deferment

**Scenario Description:**

Defer Rangeland for up to one year to manage for invasive weeds/brush, prescribed burning, to improve the rangeland health and/or provide nesting habitat for wildlife species. Keep records of dates out and monitor to determine when desired objectives of deferment are met.

**Before Situation:**

Over-grazed rangeland, native rangeland with declining rangeland health, or a newly established range planting with a need for proper grazing management.

**After Situation:**

Improve the health and vigor native rangeland, through deferment of grazing and/or improve the nesting habitat for wildlife.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $3,439.36

**Scenario Cost/Unit:** $6.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 16 | $342.24 |
| Trucking, moving livestock to new paddock | 961 | Livestock transportation costs to implement a grazing rotation using a gooseneck trailer 6'8" x 24'. Includes equipment, power unit and labor costs. | Mile | $4.36 | 50 | $218.00 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 166 | $2,138.08 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #9 - Targeted Grazing Brush Control

**Scenario Description:**

Management of woody plant species through the use of livestock that are closely herded to concentrate grazing on targeted shrubs. Typical areas have dense stands of woody non-herbaceous species that exceed the desirable ecological site condition.

**Before Situation:**

Area consist of dense stands of woody non-herbaceous species that exceed the desirable ecological site condition degrading forage quality, promoting noxious and invasive species, increasing risk of soil erosion and degrading wildlife habitat.

**After Situation:**

Woody species are grazed to limit the regrowth of targeted shrubs and achieve a desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, affected hydrology and plant health and vigor is returning to near normal levels.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $5,356.14

**Scenario Cost/Unit:** $1,785.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 24 | $937.44 |
| **Materials** | | | | | | |
| Animals used for biological weed control | 1130 | Goats, Llamas, Sheep - Includes all support: fence, water, dog, mob, etc. Includes materials and shipping only. | Head per day | $13.39 | 330 | $4,418.70 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #10 - Targeted Grazing Herbaceous Weed Control

**Scenario Description:**

Management of herbaceous plant species through the use of livestock that are closely herded to concentrate grazing on undesired herbaceous species. Typical area is moderate rolling to gentle sloping, moderately deep to deep soils that have stands of herbaceous weed species that exceed the desirable ecological site condition. This scenario is an alternative for organic producers.

**Before Situation:**

Area consist of tends of herbaceous weed species that exceed the desirable ecological site condition degrading forage quality, promoting noxious and invasive species, increasing risk of soil erosion and degrading wildlife habitat.

**After Situation:**

Herbaceous species are grazed to limit the regrowth of targeted weed species and achieve a desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $1,696.16

**Scenario Cost/Unit:** $848.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| **Materials** | | | | | | |
| Animals used for biological weed control | 1130 | Goats, Llamas, Sheep - Includes all support: fence, water, dog, mob, etc. Includes materials and shipping only. | Head per day | $13.39 | 80 | $1,071.20 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #14 - Pasture, Basic, Large Acres

**Scenario Description:**

Implement a rotational grazing on larger pasture systems on larger acreages. (Typical situation: rotation through 7 pastures, 30 acres each, 21 days each = about 210 acres). Rotational grazing enhances pasture condition and ecosystem function. Monitoring would include such things as Pasture Condition Score, recordkeeping and photo documentation. Resource Concerns: Excessive Plant Pest Pressure and Undesirable Plant Productivity and Health

**Before Situation:**

Current grazing system exhibits undesirable condition of forage plants, with invasive species present, affecting overall carrying capacity Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape. Typical size of pasture area is about 210 acres.

**After Situation:**

Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Grazing typically rotates through 7 pastures, 30 acres each, 21 days each = about 210 acres. Livestock are managed in a way that enhances pasture condition and function through protection of sensitive areas, and efficient harvest of forage resources. Grazing system success will be evaluated through monitoring using the Pasture Condition Score, recordkeeping of grazing dates and stubble height after grazing by paddock, and photo documentation.

**Feature Measure:** Acres in rotation

**Scenario Unit::** Acre

**Scenario Typical Size:** 210.0

**Scenario Total Cost:** $2,238.44

**Scenario Cost/Unit:** $10.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 56 | $2,187.36 |

**Practice:** 533 - Pumping Plant

**Scenario** #1 - Electric-Powered Pump <= 3 Hp

**Scenario Description:**

A submersible electric-powered pump is installed in a well or structure; or a close-coupled electric-powered centrifugal pump is mounted on a platform that is 3 Hp or less. Typical scenario is for a 1 Hp pump . Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

**Before Situation:**

Livestock: The present gravity flow system is inadequate to provide the proper flow rate for a prescribed grazing system. Irrigation: Available water is at an insufficient pressure to allow for even distribution of water. Waste Transfer: Contaminated water needs to be moved to a containment facility.

**After Situation:**

Livestock: Water is transferred at a sufficient rate and pressure to meet the requirements of a prescribed grazing system. Irrigation: A properly designed pump is installed to improve irrigation efficiency and reduce energy usage. Waste Transfer: Liquid wastes that have been collected through a waste transfer system are now efficiently transferred to an appropriate treatment or storage facility.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,513.03

**Scenario Cost/Unit:** $1,513.03

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 0.25 | $70.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 6 | $170.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| **Materials** | | | | | | |
| Pump, <= 5 HP, pump and motor, fixed cost portion | 1009 | Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes Includes material and shipping only. | Each | $564.23 | 1 | $564.23 |
| Pump, <= 5 HP, pump and motor, variable cost portion | 1010 | Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only. | Horsepower | $424.66 | 1 | $424.66 |

**Practice:** 533 - Pumping Plant

**Scenario** #2 - Electric-Powered Pump <= 3 HP with Pressure Tank

**Scenario Description:**

A 1 Hp submersible electric-powered pump is installed in a well or structure; or a close-coupled 1 Hp electric-powered centrifugal pump is mounted on a platform. It is used for watering livestock as part of a prescribed grazing system; or for pressurizing a small irrigation system. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline.

**Before Situation:**

Livestock: The present gravity flow system is inadequate to provide the proper flow rate for a prescribed grazing system. Irrigation: Available water is at an insufficient pressure to allow for even distribution of water.

**After Situation:**

Livestock: Water is transferred at a sufficient rate and pressure to meet the requirements of a prescribed grazing system. Irrigation: A properly designed pump is installed to improve irrigation efficiency and reduce energy usage.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,988.79

**Scenario Cost/Unit:** $1,988.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 0.25 | $70.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 6 | $170.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| **Materials** | | | | | | |
| Pump, <= 5 HP, pump and motor, fixed cost portion | 1009 | Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes Includes material and shipping only. | Each | $564.23 | 1 | $564.23 |
| Pump, <= 5 HP, pump and motor, variable cost portion | 1010 | Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only. | Horsepower | $424.66 | 1 | $424.66 |
| Pressure Tank, 40 gallon | 1038 | Pressure Tank, 40 gallon. Includes materials and shipping only. | Each | $475.76 | 1 | $475.76 |

**Practice:** 533 - Pumping Plant

**Scenario** #3 - Electric-Powered Pump >3 to 10 HP

**Scenario Description:**

A submersible electric-powered pump is installed in a well or structure; or a close-coupled electric-powered centrifugal pump is mounted on a platform that is >3 to 10 Hp. Typical scenario is for a 7.5 Hp pump Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

**Before Situation:**

Livestock: Current system consists of a series of medium pressure and inefficient pump stations to transport water to a distant and higher-elevation watering facility. Irrigation: An existing irrigation system employs an inefficient, improperly sized pump, that prevents efficient water application resulting in water loss and high energy use. Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**After Situation:**

Livestock: A single, efficient, high-pressure pumping plant is installed, eliminating intermediate pump stations, reducing energy use and enabling better system management. Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency. Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 7.0

**Scenario Total Cost:** $3,730.50

**Scenario Cost/Unit:** $532.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 0.5 | $140.49 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Pump, > 5 HP to 30 HP, pump and motor, fixed cost portion | 1011 | Fixed cost portion of a pump between 5 and 30 HP, including the pump and motor. This portion is a base cost for the pump and is not dependant on horsepower. The total cost will include this fixed cost plus a variable cost portion. Includes material and shipping only. | Each | $2,020.31 | 1 | $2,020.31 |
| Pump, > 5 HP to 30 HP, pump and motor, variable cost portion | 1012 | Variable cost portion of a pump between 5 and 30 HP, including the pump and motor. This portion is dependent on the total horsepower for the pump. The total cost will include this variable cost plus a fixed cost portion. Includes material and shipping only. | Horsepower | $128.60 | 7.5 | $964.50 |

**Practice:** 533 - Pumping Plant

**Scenario** #4 - Electric-Powered Pump >10 to 40 HP

**Scenario Description:**

A submersible electric-powered pump is installed in a well or structure; or a close-coupled electric-powered centrifugal pump is mounted on a platform that is >10 to 40 Hp. Typical scenario is a close-coupled, 3-phase, 25 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a medium-sized (600 gpm and 50 psi) sprinkler or large microirrigation (850 gpm and 35 psi) system or a large-sized surface irrigation system (1,200 gpm) or a large-sized (1,200 gpm and 25 psi) waste transfer system. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

**Before Situation:**

Irrigation: An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss and high energy use. Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**After Situation:**

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency. Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility or to a distribution system.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 25.0

**Scenario Total Cost:** $11,606.23

**Scenario Cost/Unit:** $464.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 2 | $561.94 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 56 | $1,590.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 56 | $2,646.00 |
| **Materials** | | | | | | |
| Pump, > 5 HP to 30 HP, pump and motor, fixed cost portion | 1011 | Fixed cost portion of a pump between 5 and 30 HP, including the pump and motor. This portion is a base cost for the pump and is not dependant on horsepower. The total cost will include this fixed cost plus a variable cost portion. Includes material and shipping only. | Each | $2,020.31 | 1 | $2,020.31 |
| Pump, > 5 HP to 30 HP, pump and motor, variable cost portion | 1012 | Variable cost portion of a pump between 5 and 30 HP, including the pump and motor. This portion is dependent on the total horsepower for the pump. The total cost will include this variable cost plus a fixed cost portion. Includes material and shipping only. | Horsepower | $128.60 | 25 | $3,215.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 533 - Pumping Plant

**Scenario** #5 - Electric-Powered Pump >40 HP, Centrifugal

**Scenario Description:**

A submersible electric-powered pump is installed in a well or structure; or a close-coupled electric-powered centrifugal pump is mounted on a platform that is >40 Hp. Typical scenario is a close-coupled, 3-phase, 50 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a large-sized (1,200 gpm and 50 psi) sprinkler or very large microirrigation (1,700 gpm and 35 psi) system or a very large-sized surface irrigation system (2,800 gpm) or a very large-sized (2,400 gpm and 25 psi) waste transfer system. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 313 - Waste Storage Facility; and 634 - Waste Transfer.

**Before Situation:**

Irrigation: An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss and high energy use.

**After Situation:**

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $14,821.23

**Scenario Cost/Unit:** $296.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 2 | $561.94 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 56 | $1,590.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 56 | $2,646.00 |
| **Materials** | | | | | | |
| Pump, > 5 HP to 30 HP, pump and motor, fixed cost portion | 1011 | Fixed cost portion of a pump between 5 and 30 HP, including the pump and motor. This portion is a base cost for the pump and is not dependant on horsepower. The total cost will include this fixed cost plus a variable cost portion. Includes material and shipping only. | Each | $2,020.31 | 1 | $2,020.31 |
| Pump, > 5 HP to 30 HP, pump and motor, variable cost portion | 1012 | Variable cost portion of a pump between 5 and 30 HP, including the pump and motor. This portion is dependent on the total horsepower for the pump. The total cost will include this variable cost plus a fixed cost portion. Includes material and shipping only. | Horsepower | $128.60 | 50 | $6,430.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 533 - Pumping Plant

**Scenario** #6 - Variable Frequency Drive only (no pump) <=15Hp

**Scenario Description:**

This is an installation of a Variable Frequency Drive (VFD) . The VFD consists of electrical and electronic components designed to vary the frequency of the voltage to an electric motor and thus the ability to vary the speed of the motor. This directly affects pressure and flowrate. This also could give the operator the flexibility to operate several systems separately or at the same time. Resource concerns: Insufficient water - Inefficient use of irrigation water; Inefficient energy use - Equipment and facilities and Farming/ranching practices and field operations. Associated Practices: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; and 614 - Watering Facility.

**Before Situation:**

Standard electrical connection from electrical utility to pump motor. No capability to match pump output pressure and/or flowrate to field(s) need(s). Result is over/under pressure(s) and/or flow rate(s), possible hydraulic anomalies, energy loss, and or inefficient water application in the irrigation system.

**After Situation:**

VFD Modifications are implemented at the pump site to allow for varying the speed of a 15 Hp electric motor to match the pressure and flow requirements for a center pivot irrigation system.

**Feature Measure:** VFD controller

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,433.98

**Scenario Cost/Unit:** $4,433.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 2 | $561.94 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 4 | $156.24 |
| **Materials** | | | | | | |
| Variable Speed Drive, 50 HP | 1288 | Variable speed drive for 50 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $247.72 | 15 | $3,715.80 |

**Practice:** 533 - Pumping Plant

**Scenario** #7 - Variable Frequency Drive only (no pump) >15 Hp

**Scenario Description:**

This is an installation of a Variable Frequency Drive (VFD) . The VFD consists of electrical and electronic components designed to vary the frequency of the voltage to an electric motor and thus the ability to vary the speed of the motor. This directly affects pressure and flowrate. This also could give the operator the flexibility to operate several systems separately or at the same time. Resource concerns: Insufficient water - Inefficient use of irrigation water; Inefficient energy use - Equipment and facilities and Farming/ranching practices and field operations. Associated Practices: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; and 614 - Watering Facility.

**Before Situation:**

Standard electrical connection from electrical utility to pump motor. No capability to match pump output pressure and/or flowrate to field(s) need(s). Result is over/under pressure(s) and/or flow rate(s), possible hydraulic anomalies, energy loss, and or inefficient water application in the irrigation system.

**After Situation:**

VFD Modifications are implemented at the pump site to allow for varying the speed of a 50 Hp electric motor to match the pressure and flow requirements for a center pivot irrigation system.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $13,104.18

**Scenario Cost/Unit:** $262.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 2 | $561.94 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 4 | $156.24 |
| **Materials** | | | | | | |
| Variable Speed Drive, 50 HP | 1288 | Variable speed drive for 50 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $247.72 | 50 | $12,386.00 |

**Practice:** 533 - Pumping Plant

**Scenario** #8 - Internal Combustion-Powered Pump <= 7.5 HP

**Scenario Description:**

The typical scenario supports replacement of a pump in an existing irrigation system on cropland with a 5 HP pump. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. Scenario could also be used for a 5 HP pump for silage leachate, barnyard runoff, and milk house waste (as part of a waste transfer system) at farm headquarters. The combination of higher solids content and volume require a larger horse power pump. This liquid manure pump is used to transfer semi-solid manure from a small reception pit located either below a barnyard or at the end of a free-stall barn or scrape alley. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

**Before Situation:**

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, or Waste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

**After Situation:**

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage. Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $3,573.22

**Scenario Cost/Unit:** $714.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 0.25 | $70.24 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Pump, < 50 HP, Pump & ICE power unit | 1027 | Materials, labor, controls: < 50 HP Pump & ICE power unit | Horsepower | $631.52 | 5 | $3,157.60 |

**Practice:** 533 - Pumping Plant

**Scenario** #9 - Internal Combustion-Powered Pump > 7.5 to 75 HP

**Scenario Description:**

The typical scenario supports installation of a pump in an existing irrigation system or installation of a new pump on cropland with a 60 BHP pump. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. The combination of higher solids content and volume require a larger horse power pump. This liquid manure pump is used to transfer semi-solid manure from a small reception pit located either below a barnyard or at the end of a free-stall barn or scrape alley. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; 436 - Irrigation Reservoir; and 447 - Irrigation System, Tailwater Recovery; and 614 - Watering Facility.

**Before Situation:**

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, or Waste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

**After Situation:**

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage. Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 45.0

**Scenario Total Cost:** $32,022.31

**Scenario Cost/Unit:** $711.61

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 1 | $280.97 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 16 | $756.00 |
| **Materials** | | | | | | |
| Pump, < 50 HP, Pump & ICE power unit | 1027 | Materials, labor, controls: < 50 HP Pump & ICE power unit | Horsepower | $631.52 | 45 | $28,418.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 533 - Pumping Plant

**Scenario** #10 - Internal Combustion-Powered Pump > 75 HP

**Scenario Description:**

The typical scenario supports replacement of a pump in an existing irrigation system or installation of a new pump on cropland that is 75 break HP pump or larger. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. Scenario could also be used for a pump for silage leachate, barnyard runoff, and milk house waste (as part of a waste transfer system) at farm headquarters. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

**Before Situation:**

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, or Waste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

**After Situation:**

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage. Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $43,186.06

**Scenario Cost/Unit:** $431.86

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 2 | $561.94 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 24 | $1,134.00 |
| **Materials** | | | | | | |
| Pump, > 70 HP, Pump & ICE power unit | 1029 | Materials, labor, controls: > 70 HP Pump & ICE power unit | Horsepower | $384.26 | 100 | $38,426.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 533 - Pumping Plant

**Scenario** #11 - Windmill-Powered Pump

**Scenario Description:**

A windmill is installed in order to supply a reliable water source for livestock and/or wildlife. The windmill includes the tower, concrete footings, wheel blade unit, sucker rod, down pipe, gear box, pump, plumbing, and well head protection concrete pad. The typical scenario will be a windmill system with a 10 ft diameter mill and 27-foot tower which is pumping from a 150-foot well. As a result of installing this windmill, resource concerns of inadequate stock water, plant establishment, growth, productivity, health, and vigor, and water quantity can be addressed. Resource Concerns: Insufficient stockwater.

**Before Situation:**

In a rangeland or pasture setting, a reliable source of water for livestock is not available, or the spacing between water sources is such that grazing distribution and plant health are adversely impacted.

**After Situation:**

A windmill, with a wheel ranging from 6' to 16' in diameter, will be installed over a well that is located to provide a reliable source of livestock water at the rate of at least 2 gpm, to facilitate proper grazing distribution and improved plant health. To increase reliability, water is pumped into a storage tank to provide a given number of days of supply. Installation includes the footings, wellhead protection concrete pad, tower, gear box, sail, sucker rod, down hole accessories, and a short outlet pipe to a storage tank.

**Feature Measure:** Diameter of Mill Wheel

**Scenario Unit::** Foot

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $10,934.17

**Scenario Cost/Unit:** $1,093.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 2 | $561.94 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| Aerial lift, telescoping bucket | 1893 | Aerial lift, bucket truck or cherry picker, typical 40' boom. Equipment only. | Hour | $41.41 | 8 | $331.28 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 16 | $756.00 |
| **Materials** | | | | | | |
| Windmill, 10', fan diameter | 1036 | Includes materials costs for windmill head and 27’ tower | Each | $7,792.01 | 1 | $7,792.01 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 533 - Pumping Plant

**Scenario** #12 - Solar <1 Hp

**Scenario Description:**

The typical scenario assumes installation of a submersible solar-powered pump that is less than 1 Hp in a well or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

**Before Situation:**

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and flow rate is insufficient for uniform irrigation.

**After Situation:**

The typical scenario assumes installation of a three 230-watt photovoltaic (PV) panel, capable of operating a 3/4 Hp (0.75 Hp) solar-powered submersible pump in a well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 3/4 Hp solar-powered submersible pump to deliver about 4 gpm and develop a pressure at the pump outlet of about 60 psi.). The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency.

**Feature Measure:** Number of Pump(s)

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,710.78

**Scenario Cost/Unit:** $7,710.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Pump, <= 5 HP, pump and motor, fixed cost portion | 1009 | Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes Includes material and shipping only. | Each | $564.23 | 1 | $564.23 |
| Pump, <= 5 HP, pump and motor, variable cost portion | 1010 | Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only. | Horsepower | $424.66 | 0.75 | $318.50 |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 0.75 | $6,355.53 |

**Practice:** 533 - Pumping Plant

**Scenario** #13 - Solar 1-3 Hp

**Scenario Description:**

The typical scenario assumes installation of a submersible solar-powered pump in a deep well. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

**Before Situation:**

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and flow rate is insufficient for uniform irrigation.

**After Situation:**

The typical scenario assumes installation of 6 250-watt photovoltaic (PV) panels, capable of operating a 2 Hp solar-powered submersible pump in a well Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1 Hp solar-powered submersible pump to deliver about 2.0 gpm at 750 ft of head (325 psi), combined lift and delivery pressure at well head. The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency. Irrigation expected to be for windbreak/shelterbelt plantings.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $14,597.13

**Scenario Cost/Unit:** $14,597.13

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Pump, <= 5 HP, pump and motor, fixed cost portion | 1009 | Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes Includes material and shipping only. | Each | $564.23 | 1 | $564.23 |
| Pump, <= 5 HP, pump and motor, variable cost portion | 1010 | Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only. | Horsepower | $424.66 | 2 | $849.32 |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 1.5 | $12,711.06 |

**Practice:** 533 - Pumping Plant

**Scenario** #14 - Solar >3 Hp

**Scenario Description:**

The typical scenario assumes installation of a submersible solar-powered pump in a deep well or conveying water to high elevations. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

**Before Situation:**

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and flow rate is insufficient for uniform irrigation.

**After Situation:**

The typical scenario assumes installation of 10 250-watt photovoltaic (PV) panels, capable of operating a 3.5 Hp solar-powered submersible pump in a well Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1 Hp solar-powered submersible pump to deliver about 2.0 gpm at 750 ft of head (325 psi), combined lift and delivery pressure at well head. The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency. Irrigation expected to be for windbreak/shelterbelt plantings.

**Feature Measure:** Number of pumps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $23,708.16

**Scenario Cost/Unit:** $23,708.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Pump, <= 5 HP, pump and motor, fixed cost portion | 1009 | Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes Includes material and shipping only. | Each | $564.23 | 1 | $564.23 |
| Pump, <= 5 HP, pump and motor, variable cost portion | 1010 | Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only. | Horsepower | $424.66 | 3.5 | $1,486.31 |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 1 | $472.52 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 2.5 | $21,185.10 |

**Practice:** 533 - Pumping Plant

**Scenario** #15 - Water Ram Pump

**Scenario Description:**

A water ram is used to transfer water from a live stream to a Watering Facility (614) or small Irrigation Reservoir (436) utilizing the energy of moving water to transfer a portion of that water to a higher elevation. It is anchored to a small concrete pad. Bypass water (which could easily be 90% of the water diverted from the stream) is returned to the stream or transferred in a pipe, to a lower elevation tank (614 or 436), without erosion or impairment to water quality. In the livestock scenario, the objective is to provide water to the cattle outside of a live stream or other natural water source thereby eliminating a significant erosion situation while also improving water quality. The cattle thus have access to drinking water without having to enter the stream. The water ram may need to be fenced for protection from curious bovines. While it is generally not considered practical for irrigation, in the irrigation scenario, water can be retrieved from a stream and stored in a small 436 to provide water for a very small (0.1 acre) irrigation system. Resource Concerns: Insufficient stockwater. Associated Practices: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

**Before Situation:**

Water in a nearby stream is not available at the desired location, pressure and/or flow rate.

**After Situation:**

A 2" diameter inlet pipe is installed and connected to a water ram pump with all appurtenances and anchored to a concrete pad (9 ft x 4 ft x 5 in) or other appropriate secure base. Depending upon the application, either a 1-inch diameter Livestock Pipeline (516) or an Irrigation Pipeline (430) is installed from the water ram to a 5,000 gallon storage facility. Improved water quantity or quality, grazing management, plant diversity, animal health, and/or irrigation purposes as outlined in the appropriate NRCS irrigation system standard. A 2" water ram, with 10 gpm of inlet flow and 10 feet of drop, can supply about 1.0 gpm to a location about 50 feet higher than the water ram.

**Feature Measure:** Nominal Diameter of Inlet Pipe

**Scenario Unit::** Inch

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $2,279.09

**Scenario Cost/Unit:** $1,139.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 0.5 | $140.49 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 16 | $342.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 16 | $756.00 |
| **Materials** | | | | | | |
| Pump, Ram | 1114 | Ram pump kit, 2 inch. Includes materials and shipping only. | Each | $585.96 | 1 | $585.96 |

**Practice:** 533 - Pumping Plant

**Scenario** #16 - Livestock Nose Pump

**Scenario Description:**

A Nose Pump is a diaphragm pump located in a pasture for the purpose of providing water to cattle. For a permanent installation, it is typical to also install Heavy Use Area Protection (561) (separate contract item) where the cattle congregate around the pump. It is powered and operated by cattle to transfer water from a stream to a drinking bowl. The objective is to provide water to the cattle outside of a live stream or other natural water source thereby eliminating a significant erosion situation and while also improving water quality. The cattle thus have access to drinking water without having to enter the stream. Generally one nose pump is adequate for 20 cattle. Resource Concerns: Insufficient stockwater; Inefficient energy use - Equipment and facilities. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

**Before Situation:**

Livestock have open access to a live stream or other existing natural water supply. Water supply is contaminated due to animal activity and stream banks are eroded on a daily basis. Improper cattle distribution results in poor water quality, poor grazing distribution, over grazing, and soil erosion.

**After Situation:**

One nose pump is installed with all appurtenances anchored to concrete pad with 6"x6"x10 Gauge reinforcement wire (9 ft x 4 ft x 5 in) or other appropriate secure base to supply water to cattle for improved livestock herd management. Additional Heavy Use Area Protection (561) in the form of crushed rock and at least 5 feet wide, may be installed (separate contract item) surrounding the concrete pad. Improved: water quality, soil quality, grazing management, plant diversity, and animal health.

**Feature Measure:** Number of Pumps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,300.71

**Scenario Cost/Unit:** $1,300.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 0.5 | $140.49 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Nose Pump | 1052 | Materials and delivery. | Each | $383.90 | 1 | $383.90 |

**Practice:** 533 - Pumping Plant

**Scenario** #17 - Vertical Turbine Pump, <100 Hp

**Scenario Description:**

The typical scenario supports replacement of a pump in an existing irrigation system or installation of a new pump on cropland that is equal to 100 HP pump or less. This scenario is intended for use in a deep well system. For standard wells, other scenarios should be used Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. Resource Concerns: Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management;

**Before Situation:**

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs,

**After Situation:**

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 75.0

**Scenario Total Cost:** $42,757.85

**Scenario Cost/Unit:** $570.10

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 36 | $1,981.08 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 16 | $342.24 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $20.04 | 36 | $721.44 |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $89.84 | 36 | $3,234.24 |
| Pump, Turbine, Cast Iron, fixed cost portion | 2148 | Fixed cost portion of cast iron turbine pump with appurtenances. Includes pump, appurtenances, and labor to install. | Each | $8,184.35 | 1 | $8,184.35 |
| Pump, Turbine, Cast Iron, variable cost portion | 2149 | Variable cost portion of cast iron turbine pump with appurtenances. Includes pump, appurtenances, and labor to install. | Gallon per Minute | $3.98 | 800 | $3,184.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 52 | $2,031.12 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 36 | $1,022.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 52 | $1,410.24 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 36 | $1,445.76 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Pipe, smooth steel, weight priced | 1325 | Smooth Steel pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.98 | 7854 | $15,550.92 |
| Swing Check Valve, metal, 8" | 2080 | 8" swing check valve for back flow prevention, ductile iron metal body with flange mount and lever shaft. Materials only. | Each | $1,821.56 | 1 | $1,821.56 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 533 - Pumping Plant

**Scenario** #18 - Vertical Turbine Pump >100 Hp

**Scenario Description:**

The typical scenario supports replacement of a pump in an existing irrigation system or installation of a new pump on cropland that is equal to 100 HP pump or greater. This scenario is intended for use in a deep well system. For standard wells, other scenarios should be used Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. Resource Concerns: Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management;

**Before Situation:**

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs,

**After Situation:**

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $89,891.07

**Scenario Cost/Unit:** $449.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 48 | $2,641.44 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 56 | $1,197.84 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $20.04 | 48 | $961.92 |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $89.84 | 48 | $4,312.32 |
| Pump, Turbine, Cast Iron, fixed cost portion | 2148 | Fixed cost portion of cast iron turbine pump with appurtenances. Includes pump, appurtenances, and labor to install. | Each | $8,184.35 | 1 | $8,184.35 |
| Pump, Turbine, Cast Iron, variable cost portion | 2149 | Variable cost portion of cast iron turbine pump with appurtenances. Includes pump, appurtenances, and labor to install. | Gallon per Minute | $3.98 | 1000 | $3,980.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 64 | $2,499.84 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 104 | $2,820.48 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 96 | $3,855.36 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Pipe, smooth steel, weight priced | 1325 | Smooth Steel pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.98 | 27487 | $54,424.26 |
| Swing Check Valve, metal, 8" | 2080 | 8" swing check valve for back flow prevention, ductile iron metal body with flange mount and lever shaft. Materials only. | Each | $1,821.56 | 1 | $1,821.56 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 533 - Pumping Plant

**Scenario** #19 - Piston, manure

**Scenario Description:**

A piston pump system used to transfer high solids content manure slurry through a pipeline and includes the pump, drive motor and associated equipment. In this system, the pump is 10 hp with a 12" discharge. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Associated Practices include: 374 - Farmstead Energy Improvement; 313 - Waste Storage Facility; 634 - Waste Transfer; and 590 - Nutrient Management

**Before Situation:**

Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**After Situation:**

Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility or to a distribution system.

**Feature Measure:** Number

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $21,430.04

**Scenario Cost/Unit:** $21,430.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 2 | $561.94 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 56 | $1,590.40 |
| **Materials** | | | | | | |
| Pump, Manure, Hollow Piston | 2158 | Pump, Manure, Hollow Piston, Mechanically Actuated, 12" or greater discharge, 10 HP w/ accessories. Includes delivery. | Each | $19,277.70 | 1 | $19,277.70 |

**Practice:** 533 - Pumping Plant

**Scenario** #20 - vertical manure pump, PTO

**Scenario Description:**

A PTO driven, vertical pump used to transfer liquid manure. In this system, the pump is driven by a 100 hp tractor (not included in cost) with a 6" discharge. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Associated Practices include: 374 - Farmstead Energy Improvement; 313 - Waste Storage Facility; 634 - Waste Transfer; and 590 - Nutrient Management

**Before Situation:**

Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**After Situation:**

Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility or to a distribution system.

**Feature Measure:** Number

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $14,966.89

**Scenario Cost/Unit:** $14,966.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 15 | $426.00 |
| **Materials** | | | | | | |
| Pump, Manure, PTO, Vertical Shaft | 2159 | Pump, Manure, PTO, Vertical Shaft, 6" discharge, HP 70 to 110 (540 RPM) or HP 125 to 140 (1000 RPM), with agitating nozzle and propeller. Includes delivery. | Each | $14,540.89 | 1 | $14,540.89 |

**Practice:** 533 - Pumping Plant

**Scenario** #21 - chopper manure pump

**Scenario Description:**

A chopper pump used to transfer slurry/liquid manure. Typical system includes a pump and 10 hp motor. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Associated Practices include: 374 - Farmstead Energy Improvement; 313 - Waste Storage Facility; 634 - Waste Transfer; and 590 - Nutrient Management

**Before Situation:**

Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**After Situation:**

Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility or to a distribution system.

**Feature Measure:** Number

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,245.17

**Scenario Cost/Unit:** $2,245.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 15 | $426.00 |
| **Materials** | | | | | | |
| Pump, Chopper, Screw, >7 to 15 HP, includes pump & motor | 1026 | Materials, labor, controls: Chopper/ Screw >7 to 15 HP includes pump & motor | Horsepower | $1,819.17 | 1 | $1,819.17 |

**Practice:** 533 - Pumping Plant

**Scenario** #22 - Turbine, Pump Only

**Scenario Description:**

A submersible pumping a well or structure is removed and replaced with a new pump that has the proper performance requirements, or the existing pump is rebowled to operate at the proper performance required to meet the demand. Typical scenario is a pump driven by a 50 Hp electric motor and is being replaced or rebuilt to meet new conservation performance requirements. This scenario covers the cost for the removal of the pump from the well and the installation of the rebuilt or new pump.
Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 313 - Waste Storage Facility; and 634 - Waste Transfer.

**Before Situation:**

Irrigation: An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss and high energy use.

**After Situation:**

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency. A typical flow for the rebuilt or new pump is 300 gpm.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $9,378.35

**Scenario Cost/Unit:** $187.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Pump, Turbine, Cast Iron, fixed cost portion | 2148 | Fixed cost portion of cast iron turbine pump with appurtenances. Includes pump, appurtenances, and labor to install. | Each | $8,184.35 | 1 | $8,184.35 |
| Pump, Turbine, Cast Iron, variable cost portion | 2149 | Variable cost portion of cast iron turbine pump with appurtenances. Includes pump, appurtenances, and labor to install. | Gallon per Minute | $3.98 | 300 | $1,194.00 |

**Practice:** 533 - Pumping Plant

**Scenario** #73 - Electric-Powered Pump, <40 HP, with VFD

**Scenario Description:**

An electric-powered centrifugal or turbine pump is installed in a well (submersible) or mounted on a platform that is <40 HP. Typical scenario is a 25 horsepower electric-powered pump mounted on a platform for supplying water to an irrigation system which requires variable flow rates. A variable frequency drive (VFD) controller is connected to the pump motor to vary flow rates based on demand, resulting in water conservation or improved nutrient management. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 430 - Irrigation Pipeline; 441 - Irrigation System, Micro-irrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer.

**Before Situation:**

An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss or improper nutrient application.

**After Situation:**

A properly designed and efficient 25 horsepower pumping plant and VFD are installed. The pump and VFD can vary the flow rate based on demand from the associated irrigation system resulting in improved irrigation efficiency and or nutrient application.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 25.0

**Scenario Total Cost:** $21,638.73

**Scenario Cost/Unit:** $865.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $89.84 | 40 | $3,593.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| **Materials** | | | | | | |
| Pump, motor and variable frequency drive, fixed cost portion | 1016 | Fixed cost portion of the Pump: Pump, motor and variable frequency drive. This portion is a base cost for all Pump: Pump, motor and variable frequency drive and is not dependant on horsepower. The total cost of any Pump: Pump, motor and variable frequency drive will include this fixed cost plus a variable cost portion. The completed Pump: Pump, motor and variable frequency drive will include the motor and controls. This cost will include material, labor and equipment. | Each | $7,351.73 | 1 | $7,351.73 |
| Pump, motor and variable frequency drive, variable cost portion | 1017 | Variable cost portion of the Pump: Pump, motor and variable frequency drive. This portion IS dependent on the total horsepower for the Pump: Pump, motor and variable frequency drive. The total cost of any Pump: Pump, motor and variable frequency drive will include this variable cost plus the fixed cost portion. The completed Pump: Pump, motor and variable frequency drive will include the motor and controls. This cost will include material, labor and equipment. | Horsepower | $272.60 | 25 | $6,815.00 |

**Practice:** 533 - Pumping Plant

**Scenario** #76 - Electric-Powered Pump, > or equal 40 HP, with VFD

**Scenario Description:**

An electric-powered centrifugal or turbine pump is installed in a well (submersible) or mounted on a platform that is > or equal to 40 HP. Typical scenario is a 50 horsepower electric-powered pump mounted on a platform for supplying water to an irrigation system which requires variable flow rates. A variable frequency drive (VFD) controller is connected to the pump motor to vary flow rates based on demand, resulting in water conservation or improved nutrient management. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 430 - Irrigation Pipeline; 441 - Irrigation System, Micro-irrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer.

**Before Situation:**

An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss or improper nutrient application.

**After Situation:**

A properly designed and efficient 50 horsepower pumping plant and VFD are installed. The pump and VFD can vary the flow rate based on demand from the associated irrigation system resulting in improved irrigation efficiency and or nutrient application.

**Feature Measure:** Pump Horsepower

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $26,181.73

**Scenario Cost/Unit:** $523.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $89.84 | 40 | $3,593.60 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| **Materials** | | | | | | |
| Pump, motor and variable frequency drive, fixed cost portion | 1016 | Fixed cost portion of the Pump: Pump, motor and variable frequency drive. This portion is a base cost for all Pump: Pump, motor and variable frequency drive and is not dependant on horsepower. The total cost of any Pump: Pump, motor and variable frequency drive will include this fixed cost plus a variable cost portion. The completed Pump: Pump, motor and variable frequency drive will include the motor and controls. This cost will include material, labor and equipment. | Each | $7,351.73 | 1 | $7,351.73 |
| Pump, motor and variable frequency drive, variable cost portion | 1017 | Variable cost portion of the Pump: Pump, motor and variable frequency drive. This portion IS dependent on the total horsepower for the Pump: Pump, motor and variable frequency drive. The total cost of any Pump: Pump, motor and variable frequency drive will include this variable cost plus the fixed cost portion. The completed Pump: Pump, motor and variable frequency drive will include the motor and controls. This cost will include material, labor and equipment. | Horsepower | $272.60 | 50 | $13,630.00 |

**Practice:** 548 - Grazing Land Mechanical Treatment

**Scenario** #3 - Pasture Treatment

**Scenario Description:**

Aeration or other treatments will be used to break the restrictive layers that will increase water infiltration and break up sod and thatch on introduced forages. Depth of treatment will be 1" deeper than the restrictive layer. Resource concerns addressed include: Plant productivity & health and soil compaction.

**Before Situation:**

Forage growth on pastureland is limited by compacted soils layers and /or dense sod with a thatch build up.

**After Situation:**

Forage growth is increased due to greater rooting depths and water infiltration. Prescribed Grazing (528) will follow the treatment.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $2,122.55

**Scenario Cost/Unit:** $70.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Site Preparation, Mechanical | 944 | Aerator, rolling drum chopper, etc. Includes equipment, power unit and labor costs. | Acre | $61.14 | 30 | $1,834.20 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 1 | $39.06 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 550 - Range Planting

**Scenario** #1 - Nonnative Species Drilled

**Scenario Description:**

Establishment of a mixture of non-native adapted perennial species on a rangeland unit to improve forage condition, improve wildlife habitat and/or reduce erosion. Seed mix of predominantly non-native species is chosen based on range conditions and availability of seed. Preparing a seedbed may be required prior to seeding with a no-till drill or range drill.

**Before Situation:**

Poor or nonexistent stand of herbaceous species. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable non-native species are established to improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or improve wildlife habitat. The typical size of the practice is 80 acres.

**Feature Measure:** Acres of Range Planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $10,356.98

**Scenario Cost/Unit:** $129.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 160 | $1,750.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 160 | $2,608.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 80 | $1,677.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $44.94 | 80 | $3,595.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 550 - Range Planting

**Scenario** #2 - Native Species High Forb Drilled

**Scenario Description:**

Establishment of a mixture of predominately native adapted perennial species on a rangeland unit to improve forage condition, improve wildlife habitat and/or reduce erosion. Seed mix of Predominantly Native species is chosen based on range conditions and availability of seed. Preparing a seedbed may be required prior to seeding with a no-till drill or range drill.

**Before Situation:**

Poor or nonexistent stand of herbaceous species. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable native species are established to improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or improve wildlife habitat. The typical size of the practice is 80 acres.

**Feature Measure:** Acres of Range Planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $32,294.58

**Scenario Cost/Unit:** $403.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 160 | $1,750.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 160 | $2,608.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 80 | $1,677.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Three Species Mix, Cool Season, Native Perennial Grass | 2316 | Cool season, native grass mix. Includes material and shipping only. | Acre | $139.51 | 80 | $11,160.80 |
| One Species, Native Forb, Low Cost | 2329 | Native forb. Includes material and shipping only. | Acre | $179.65 | 80 | $14,372.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 550 - Range Planting

**Scenario** #3 - Native Species Low Forb Drilled

**Scenario Description:**

Establishment of a mixture of predominately native adapted perennial species on a rangeland unit to improve forage condition, improve wildlife habitat and/or reduce erosion. Seed mix of Predominantly Native species is chosen based on range conditions and availability of seed. Preparing a seedbed may be required prior to seeding with a no-till drill or range drill.

**Before Situation:**

Poor or nonexistent stand of herbaceous species. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable native species are established to improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or improve wildlife habitat. The typical size of the practice is 80 acres.

**Feature Measure:** Acres of Range Planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $21,515.58

**Scenario Cost/Unit:** $268.94

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 160 | $1,750.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 160 | $2,608.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 80 | $1,677.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Three Species Mix, Cool Season, Native Perennial Grass | 2316 | Cool season, native grass mix. Includes material and shipping only. | Acre | $139.51 | 80 | $11,160.80 |
| One Species, Native Forb, Low Cost | 2329 | Native forb. Includes material and shipping only. | Acre | $179.65 | 20 | $3,593.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 550 - Range Planting

**Scenario** #4 - Non-Native Species Broadcast

**Scenario Description:**

Establishment of a mixture of non-native adapted perennial species on a rangeland unit to improve forage condition, improve wildlife habitat and/or reduce erosion. Seed mix of Predominantly non-native species is chosen based on range conditions and availability of seed. Preparing a seedbed may be required prior to broadcast seeding .Typical seeding rate is 18lbs PLS. Equipment used can be ground or aerial application.

**Before Situation:**

Poor or nonexistent stand of herbaceous species. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable non-native species are established to improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or improve wildlife habitat. The typical size of the practice is 80 acres.

**Feature Measure:** Acres of Range Planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $13,021.78

**Scenario Cost/Unit:** $162.77

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 160 | $1,750.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 160 | $3,355.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $44.94 | 160 | $7,190.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 550 - Range Planting

**Scenario** #5 - Native Species Broadcast

**Scenario Description:**

Establishment of a mixture of predominately native adapted perennial species on a rangeland unit to improve forage condition, improve wildlife habitat and/or reduce erosion. Seed mix of Predominantly Native species is chosen based on range conditions and availability of seed. Preparing a seedbed may be required prior to broadcast seeding .Typical seeding rate is 18lbs PLS. Equipment used can be ground or aerial application.

**Before Situation:**

Poor or nonexistent stand of herbaceous species. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable native species are established to improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or improve wildlife habitat. The typical size of the practice is 80 acres.

**Feature Measure:** Acres of Range Planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $35,338.98

**Scenario Cost/Unit:** $441.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 160 | $1,750.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 160 | $3,355.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Three Species Mix, Cool Season, Native Perennial Grass | 2316 | Cool season, native grass mix. Includes material and shipping only. | Acre | $139.51 | 160 | $22,321.60 |
| One Species, Native Forb, Low Cost | 2329 | Native forb. Includes material and shipping only. | Acre | $179.65 | 40 | $7,186.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 550 - Range Planting

**Scenario** #6 - Shrub Plugs

**Scenario Description:**

The field is seeded to shrub species such as Sage Brush, Bitter Brush or other species for re-establishment or enhancement of desirable vegetation. Plug plantings are typically 1000 per acre. This practice scenario is typically used to improve plant composition/structure and provide or increase wildlife forage, reduce soil erosion, or improve soil and water quality. This scenario can also be used for flowering plant pollinator seedlings in all precipitation zones.

**Before Situation:**

Poor or nonexistent stand of herbaceous species. Resource concerns may include undesirable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable species are established to improve or maintain livestock nutrition, provide or increase forage supply, reduce soil erosion, improve soil and water quality, or improve wildlife habitat. The typical size of the practice is 5 acres.

**Feature Measure:** Acres of Range Planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $10,052.64

**Scenario Cost/Unit:** $2,010.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 32 | $395.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 5000 | $8,350.00 |

**Practice:** 554 - Drainage Water Management

**Scenario** #1 - Drainage Water Management (DWM)

**Scenario Description:**

This scenario is the process of managing water discharges from surface and/or subsurface agricultural drainage systems by reducing nutrient loading into surface waters. Typical systems consist of a 75 acre field with existing drainage tile lines and installed water control structures. The operator goes to the field in order to adjust water control structures (riser boards). While on site the date and adjustment information is recorded/logged. The number of yearly adjustments is based on 6 trips to a field 5 miles from headquarters. The field time to make and record each adjustment is 0.5 hours per structure (including travel time). The typical field will contain 5 water control structures; 3 structures control field water levels and 2 structures control a single denitrifying bioreactor. Resource Concern: Water Quality - Excess Nutrients in surface and ground waters. Associated Practices: 606-Subsurface Drain; 607-Surface Drain, Field Ditch; 608-Surface Drain, Main or Lateral; 587-Structure for Water Control; 590-Nutrient Management .

**Before Situation:**

Existing drainage systems are in place and water flows uncontrolled.

**After Situation:**

Existing drainage systems are managed to reduce flow of field drainage waters from the site and reduce nitrate loading by denitrification.

**Feature Measure:** Number of Control Structures

**Scenario Unit::** Each

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $607.35

**Scenario Cost/Unit:** $121.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 0.33 | $21.45 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 15 | $585.90 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #1 - Roof Gutter, small

**Scenario Description:**

A roof runoff structure, consisting of 4"-6" gutter(s), downspout(s), and a 50' section of outlet line. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns. Outlet lines in excess of 50' should be contracted under Underground Outlet, 620. Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Watering Facility (614), Underground Outlet (620), Diversion (362), and any relevant irrigation practices.

**Before Situation:**

Roofs have no gutter. Roof runoff water enters areas where it mixes with contaminated materials and causes a resource concern. Applicable where: (1) a roof runoff management facility is included in an overall plan for an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, control, and transport runoff from roofs to a stable outlet.

**After Situation:**

A gutter, downspout, and outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. The typical scenario is for a roof line of 200 ft serviced with 5" gutters, downspouts, and 50' of outlet line. Outlet line in excess of 50' is contracted using Underground Outlet, 620 as needed to allow for discharge of roof water in an acceptable, stable site.

**Feature Measure:** Linear Length of Roof to be Gutter

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $1,951.34

**Scenario Cost/Unit:** $9.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 24 | $681.60 |
| **Materials** | | | | | | |
| Pipe, HDPE, 4", PCPT, Single Wall | 1270 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only. | Foot | $0.48 | 50 | $24.00 |
| Gutter, Aluminum, Small | 1689 | Aluminum gutter (4" to 6") in width with hangers. Materials only. | Foot | $2.86 | 200 | $572.00 |
| Downspout, Aluminum, Small | 1700 | Aluminum downspout (3" to 5") in width with hangers. Materials only. | Foot | $2.82 | 120 | $338.40 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #2 - Roof Gutter, medium

**Scenario Description:**

A roof runoff structure, consisting of 7"-9" gutter(s), downspout(s), and a 50' section of outlet line. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns. Outlet lines in excess of 50' should be contracted under Underground Outlet, 620. Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Watering Facility (614), Underground Outlet (620), Diversion (362), and any relevant irrigation practices.

**Before Situation:**

Roofs have no gutter. Roof runoff water enters areas where it mixes with contaminated materials and causes a resource concern. Applicable where: (1) a roof runoff management facility is included in an overall plan for an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, control, and transport runoff from roofs to a stable outlet.

**After Situation:**

A gutter, downspout, and outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. The typical scenario is for a roof line of 200 ft serviced with 8" gutters, downspouts, and 50' of outlet line. Outlet line in excess of 50' is contracted using Underground Outlet, 620 as needed to allow for discharge of roof water in an acceptable, stable site.

**Feature Measure:** Linear Length of Roof to be Gutter

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $2,979.04

**Scenario Cost/Unit:** $14.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 24 | $681.60 |
| **Materials** | | | | | | |
| Pipe, HDPE, 4", PCPT, Single Wall | 1270 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only. | Foot | $0.48 | 50 | $24.00 |
| Gutter, Aluminum, Medium | 1690 | Aluminum gutter (7" to 9") in width with hangers. Materials only. | Foot | $9.56 | 200 | $1,912.00 |
| Downspout, Aluminum | 1701 | Aluminum downspout with hangers. Materials only. Deletion Scheduled for FY 2018 Payment Schedule Cycle | Foot | $2.61 | 10 | $26.10 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #3 - Roof Gutter, large

**Scenario Description:**

A roof runoff structure, consisting of 10"-12" gutter(s), downspout(s), and a 50' section of outlet line. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns. Outlet lines in excess of 50' should be contracted under Underground Outlet, 620. Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Watering Facility (614), Underground Outlet (620), Diversion (362), and any relevant irrigation practices.

**Before Situation:**

Roofs have no gutter. Roof runoff water enters areas where it mixes with contaminated materials and causes a resource concern. Applicable where: (1) a roof runoff management facility is included in an overall plan for an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, control, and transport runoff from roofs to a stable outlet.

**After Situation:**

A gutter, downspout, and outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. The typical scenario is for a roof line of 200 ft serviced with 10" gutters, downspouts, and 50' of outlet line. Outlet line in excess of 50' is contracted using Underground Outlet, 620 as needed to allow for discharge of roof water in an acceptable, stable site.

**Feature Measure:** Linear Length of Roof to be Gutter

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $5,877.54

**Scenario Cost/Unit:** $29.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 24 | $681.60 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SCH 40 | 980 | Materials: - 6" - PVC - SCH 40 - ASTM D1785 | Foot | $6.33 | 50 | $316.50 |
| Gutter, Aluminum, Large | 1691 | Aluminum gutter (10" to 12") in width with hangers. Materials only. | Foot | $22.59 | 200 | $4,518.00 |
| Downspout, Aluminum | 1701 | Aluminum downspout with hangers. Materials only. Deletion Scheduled for FY 2018 Payment Schedule Cycle | Foot | $2.61 | 10 | $26.10 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #6 - Roof Gutter, less than 50ft in length

**Scenario Description:**

A roof runoff structure which has less than 50 feet in total gutter length, typically consisting of 4"-6" gutter(s), downspout(s), and a 50' section of outlet line on a small building or portion of a building. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns. Outlet lines in excess of 50' should be contracted under Underground Outlet, 620. Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Watering Facility (614), Underground Outlet (620), Diversion (362), and any relevant irrigation practices.

**Before Situation:**

Roofs or portions of roofs have no gutter. Roof runoff water enters areas where it mixes with contaminated materials and causes a resource concern. Applicable where: (1) a roof runoff management facility is included in an overall plan for an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, control, and transport runoff from roofs to a stable outlet.

**After Situation:**

A gutter, downspout, and outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. The typical scenario is for a roof line of 50 ft serviced with 5" gutters, downspouts, and 50' of outlet line. Outlet line in excess of 50' is contracted using Underground Outlet, 620 as needed to allow for discharge of roof water in an acceptable, stable site.

**Feature Measure:** Linear Length of Roof to be Gutter

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,116.50

**Scenario Cost/Unit:** $22.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Pipe, HDPE, 5", PCPT, Single Wall | 1271 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 5" diameter - ASTM F405. Material cost only. | Foot | $0.73 | 50 | $36.50 |
| Gutter, Aluminum, Small | 1689 | Aluminum gutter (4" to 6") in width with hangers. Materials only. | Foot | $2.86 | 50 | $143.00 |
| Downspout, Aluminum, Small | 1700 | Aluminum downspout (3" to 5") in width with hangers. Materials only. | Foot | $2.82 | 10 | $28.20 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #7 - Tank, 2,000 gallons or less, with gutters and downspouts

**Scenario Description:**

Install a 2,000 gallon or less above-ground tank (concrete, steel, aluminum, plastic, etc.), downspout, and gutter to collect rain water from an existing roof structure. Stored water can be used for livestock watering facilities, irrigation, or other conservation practices. The tank shall be constructed of approved materials that stores adequate quantity of water to meet the intended use requirements. All components used will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. Resource concerns addressed include: Inadequate water quantity for livestock, wildlife or crops; habitat degradation, water quality, and undesirable plant productivity and health. Associated Practices: 614 - Watering Facility; 516 - Livestock Pipeline; 620 - Underground Outlet; 430 - Irrigation Pipeline; 441 - Micro Irrigation; 533 - Pumping Plant; 342 - Critical Area Planting; 382 - Fencing

**Before Situation:**

There is an existing roof , but there is no storage available. Water is not available in sufficient quantity or at the required times to provide for wildlife, livestock watering, irrigation, or for other conservation practices. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock, wildlife and or other conservation practices; where water is not available in sufficient quantities at specific locations; and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

A 750 gallon above-ground tank, 200 feet of gutter, and 80 feet of downspout are installed to collect water from an existing roof. Tank will provide adequate water storage capacity to ensure against inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, water quantity, crops, and undesirable plant productivity and health.

**Feature Measure:** Gallons of Tank Storage Capacity

**Scenario Unit::** Gallon

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $3,332.89

**Scenario Cost/Unit:** $3.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 28 | $795.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| **Materials** | | | | | | |
| Tank, Poly enclosed Storage, 300-1000 gal | 1074 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.92 | 750 | $690.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 2 | $39.28 |
| Gutter, Aluminum, Small | 1689 | Aluminum gutter (4" to 6") in width with hangers. Materials only. | Foot | $2.86 | 200 | $572.00 |
| Downspout, Aluminum, Small | 1700 | Aluminum downspout (3" to 5") in width with hangers. Materials only. | Foot | $2.82 | 80 | $225.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #8 - Tank, Greater than 2,000 gallons, with gutters and downspouts

**Scenario Description:**

Install a greater than 2,000 gallon above-ground tank (concrete, steel, aluminum, plastic, etc.), downspout, and gutter to collect rain water from an existing roof structure. Stored water can be used for livestock watering facilities, irrigation, or other conservation practices. The tank shall be constructed of approved materials that stores adequate quantity of water to meet the intended use requirements. All components used will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. Resource concerns addressed include: Inadequate water quantity for livestock, wildlife or crops; habitat degradation, water quality, and undesirable plant productivity and health. Associated Practices: 614 - Watering Facility; 516 - Livestock Pipeline; 620 - Underground Outlet; 430 - Irrigation Pipeline; 441 - Micro Irrigation; 533 - Pumping Plant; 342 - Critical Area Planting; 382 - Fencing

**Before Situation:**

There is an existing roof , but there is no storage available. Water is not available in sufficient quantity or at the required times to provide for wildlife, livestock watering, irrigation, or for other conservation practices. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock, wildlife and or other conservation practices; where water is not available in sufficient quantities at specific locations; and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

A 5,000 gallon above-ground tank, 200 feet of gutter, and 80 feet of downspout are installed to collect water from an existing roof. Tank will provide adequate water storage capacity to ensure against inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, water quantity, crops, and undesirable plant productivity and health.

**Feature Measure:** Gallons of Tank Storage Capacity

**Scenario Unit::** Gallon

**Scenario Typical Size:** 5,000.0

**Scenario Total Cost:** $7,835.44

**Scenario Cost/Unit:** $1.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 16 | $880.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 24 | $681.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 16 | $642.56 |
| **Materials** | | | | | | |
| Tank, Poly Enclosed Storage, >1,000 | 1075 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.97 | 5000 | $4,850.00 |
| Gutter, Aluminum, Small | 1689 | Aluminum gutter (4" to 6") in width with hangers. Materials only. | Foot | $2.86 | 200 | $572.00 |
| Downspout, Aluminum | 1701 | Aluminum downspout with hangers. Materials only. Deletion Scheduled for FY 2018 Payment Schedule Cycle | Foot | $2.61 | 80 | $208.80 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #14 - Tank, greater than 1,000 gallons - no gutters

**Scenario Description:**

Install a 1,000 gallon or greater above-ground tank (usually a poly-tank) to store rain water from an existing roof structure that has gutters and downspouts. Stored water can be used for livestock watering facilities, irrigation, or other conservation practices. The tank shall be constructed of approved materials that stores adequate quantity of water to meet the intended use requirements. All components used will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. Resource concerns addressed include: Inadequate water quantity for livestock, wildlife or crops; habitat degradation, water quality, and undesirable plant productivity and health. Associated Practices: 614 - Watering Facility; 516 - Livestock Pipeline; 620 - Underground Outlet; 430 - Irrigation Pipeline; 441 - Micro Irrigation; 533 - Pumping Plant; 342 - Critical Area Planting; 382 - Fencing

**Before Situation:**

There is an existing roof with gutters and downspout, but there is no water storage system. At the site, water is not available in sufficient quantity or at the required times to provide for wildlife, livestock watering, irrigation, or for other conservation practices. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock, wildlife and or other conservation practices; where water is not available in sufficient quantities at specific locations; and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

A 3,000 gallon above-ground tank is installed to collect water from an existing roof with gutter system. Tank will provide adequate water storage capacity to ensure against inadequate supply of water for livestock and/or wildlife, habitat degradation, water quality, water quantity, crops, and undesirable plant productivity and health.

**Feature Measure:** tank capacity (gallons)

**Scenario Unit::** Gallon

**Scenario Typical Size:** 3,000.0

**Scenario Total Cost:** $6,206.84

**Scenario Cost/Unit:** $2.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 3 | $842.91 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 16 | $880.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 24 | $681.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 16 | $642.56 |
| **Materials** | | | | | | |
| Tank, Poly Enclosed Storage, >1,000 | 1075 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.97 | 3000 | $2,910.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #15 - Tank, 1,000 gallons or less - no gutters

**Scenario Description:**

Install a 1,000 gallon or less above-ground tank (usually a poly-tank) to store rain water from an existing roof structure that has gutters and downspouts. Stored water can be used for livestock watering facilities, irrigation, or other conservation practices. The tank shall be constructed of approved materials that stores adequate quantity of water to meet the intended use requirements. All components used will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. Resource concerns addressed include: Inadequate water quantity for livestock, wildlife or crops; habitat degradation, water quality, and undesirable plant productivity and health. Associated Practices: 614 - Watering Facility; 516 - Livestock Pipeline; 620 - Underground Outlet; 430 - Irrigation Pipeline; 441 - Micro Irrigation; 533 - Pumping Plant; 342 - Critical Area Planting; 382 - Fencing

**Before Situation:**

There is an existing roof with gutters and downspouts, but there is no storage capacity. At the site, water is not available in sufficient quantity or at the required times to provide for wildlife, livestock watering, irrigation, or for other conservation practices. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock, wildlife and or other conservation practices; where water is not available in sufficient quantities at specific locations; and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

A 750 gallon above-ground tank is installed to collect water from an existing roof with gutter system. Tank will provide adequate water storage capacity to ensure against inadequate supply of water for livestock and/or wildlife, habitat degradation, water quality, water quantity, crops, and undesirable plant productivity and health.

**Feature Measure:** tank capacity (gallons)

**Scenario Unit::** Gallon

**Scenario Typical Size:** 750.0

**Scenario Total Cost:** $2,080.89

**Scenario Cost/Unit:** $2.77

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| **Materials** | | | | | | |
| Tank, Poly enclosed Storage, 300-1000 gal | 1074 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.92 | 750 | $690.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 2 | $39.28 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 560 - Access Road

**Scenario** #1 - New Road, Earth, <10% Hillside Slope

**Scenario Description:**

Newly constructed compacted earth road on a site where the hillside slope (slope across the road prism) is <10%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural or forestry enterprise which requires, but does not have, a fixed travelway for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively dry and level terrain lands.

**After Situation:**

The typical scenario is for a road a minimum of 14 feet wide at the top, minimal embankment with 1' of fill imported for grading, typical side slopes 2:1. Typical constructed road length is 1,000 feet. A properly constructed, well defined access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land or brush clearing in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587), Stream Crossings (578) or Fish Passage (396) depending on the type of structure. Diversions constructed as part of access road should be covered by Diversion (362). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Roadway Treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $5,999.73

**Scenario Cost/Unit:** $6.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 670 | $2,927.90 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 670 | $2,405.30 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.87 | 300 | $261.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 4 | $156.24 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 560 - Access Road

**Scenario** #2 - New Road, Surfaced, <10% Hillside Slope

**Scenario Description:**

Newly Constructed road with gravel surfacing (typically min. 12 inch thick compacted gravel surface) where the hillside slope (slope across the road prism) is <10%. Newly constructed compacted earth road on a site where the hillside slope (slope of the hillside perpendicular to the road, not the road slope) is <10%. A properly constructed, well defined access road will address resource concerns related to compaction, emissions of fugitive dust, and excessive sediment in surface water. It will also improve the plant productivity, vigor and health and substantially reduce the chance of wild fire. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural or forestry enterprise which requires, but does not have, a fixed travel way for equipment and vehicles for various resource activities, and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively wet and swampy but level terrain lands.

**After Situation:**

The road will be 14 feet wide with 8 inch gravel surfacing at the top with geotextile under it, minimal embankment with 1' of fill imported for grading, typical side slopes 2:1 with 12 inches of gravel surface. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If brush clearing in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587), Stream Crossings (578) or Fish Passage (396) depending on the type of structure. Diversions constructed as part of access road should be covered by Diversion (362). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Roadway Treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $21,803.53

**Scenario Cost/Unit:** $21.80

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 2000 | $5,100.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 670 | $2,927.90 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 670 | $2,405.30 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.87 | 300 | $261.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 4 | $156.24 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 545 | $10,703.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 560 - Access Road

**Scenario** #5 - New Road, Earth, >10% Hillside Slope

**Scenario Description:**

Newly constructed compacted earth road (typically constructed using side cast methods) in areas where the hillside slope (slope across the road prism) is equal to or greater than 10%. A properly constructed, well defined access road will address resource concerns related to compaction, emissions of fugitive dust, and excessive sediment in surface water. It also will improve the plant productivity, vigor and health and substantially reduce the chance of wild fire. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural or forestry enterprise which requires, but does not have, a fixed travelway for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively dry lands with steep slopes.

**After Situation:**

The road will be a minimum of 14 feet wide at the top, 50% in embankment and 50% in excavation less than 3 feet in height, (average 2 ft) typical cut and fill side slopes 2:1 with 12 inches of gravel surface. Out of total excavation, 80% is considered common earth and 20% hard dig or rocks. A properly constructed, well defined access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If brush clearing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587), Stream Crossings (578) or Fish Passage (396) depending on the type of structure. Diversions constructed as part of access road should be covered by Diversion (362). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Roadway Treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $11,964.74

**Scenario Cost/Unit:** $11.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 370 | $1,813.00 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 555 | $1,282.05 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 925 | $4,042.25 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 925 | $3,320.75 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 2 | $129.84 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.87 | 300 | $261.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 560 - Access Road

**Scenario** #6 - New Road, Surfaced, 10%-40% Hillside Slope

**Scenario Description:**

Newly Constructed gravel road with surfacing (typically min. 12 inch thick compacted gravel surface) areas where the hillside slope (slope across the road prism) is 10%-40%. A properly constructed, well defined access road will address resource concerns related to compaction, emissions of fugitive dust, and excessive sediment in surface water. It also will improve the plant productivity, vigor and health and substantially reduce the chance of wild fire. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural or forestry enterprise which requires, but does not have, a fixed travelway for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of wet and swampy land areas with steep sloped terrain.

**After Situation:**

The road will be a minimum of 14 feet wide with 12 inch gravel surfacing at the top. It is 50% in embankment and 50% in excavation less than 3 feet in height, (average 2 ft) typical side slopes 2:1 with an 12 inches of gravel surface. Typical Length is 1,000 ft. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If brush clearing in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587), Stream Crossings (578) or Fish Passage (396) depending on the type of structure. Diversions constructed as part of access road should be covered by Diversion (362). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Roadway Treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $27,768.54

**Scenario Cost/Unit:** $27.77

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 2000 | $5,100.00 |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 370 | $1,813.00 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 555 | $1,282.05 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 925 | $4,042.25 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 925 | $3,320.75 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 2 | $129.84 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.87 | 300 | $261.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 545 | $10,703.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 560 - Access Road

**Scenario** #9 - Erosion Control, Unsurfaced

**Scenario Description:**

Installation of water bars, ditch outs, rolling dips, in sloping, out sloping, and crowning on existing earthen roads to divert water and provide erosion control. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also will improve the plant productivity, vigor and health and substantially reduce the chance of wild fire. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural or forestry enterprise with an existing unsurfaced access road that has surface erosion causing sediment to enter nearby water bodies. If left in its current condition, it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the overall road bed is functional but is causing sediment transport off the road.

**After Situation:**

Practices such as water bars, rolling dips, and ditch out's are installed along with road crowning or sloping, as needed, to break up the flow of water on the road and reduce or eliminate sediment transport. The eroding portions of the road will be repaired to a minimum of 14 feet wide at the top. A properly repaired access road will greatly reduce or eliminate excessive sediment in surface water by reducing uncontrolled sediment transport, reduce soil erosion, and improving drainage of irrigated lands. Planned grades will include all dips and water bars. Pipe culverts installed as part of access road to create or maintain hydrologic connectivity should be covered by either Structures for Water Control (587) (cross drains), Stream Crossings (578) or Fish Passage (396) depending on the type of structure. When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Roadway Treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $1,631.84

**Scenario Cost/Unit:** $1.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 11 | $714.12 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 11 | $441.76 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 560 - Access Road

**Scenario** #10 - Erosion Control, Surfaced

**Scenario Description:**

Installation of water bars, ditch outs, rolling dips, in sloping, out sloping, and crowning on existing gravel roads to divert water and provide erosion control. Except for the quantity of gravel, the extent of construction work over an existing alignment is assumed to average 20% of the work for a new installation. The quantity of gravel for a erosion control is about 20% of that for a new road surface. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also will improve the plant productivity, vigor and health and substantially reduce the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural or forestry enterprise with an existing access road that has surface erosion causing sediment to enter nearby water bodies. If left in its current condition, it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the overall road bed is functional but is causing sediment transport off the road.

**After Situation:**

Practices such as water bars, rolling dips, and ditch out's are installed along with road crowning or sloping, as needed, to break up the flow of water on a surfaced road and reduce or eliminate sediment transport. The eroding portions of the road will be repaired to a minimum of 14 feet wide at the top. Treated road length is 1,000 feet. Gravel surfacing is placed on ~200' of road length. A properly repaired access road will greatly reduce or eliminate excessive sediment in surface water by reducing uncontrolled sediment transport, reduce soil erosion, and improving drainage of irrigated lands. Planned grades will include all dips and water bars. Pipe culverts installed as part of access road to create or maintain hydrologic connectivity should be covered by either Structures for Water Control (587) (cross drains), Stream Crossings (578) or Fish Passage (396) depending on the type of structure. When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Roadway Treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $4,595.49

**Scenario Cost/Unit:** $4.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 315 | $803.25 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 11 | $714.12 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 11 | $441.76 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 110 | $2,160.40 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 560 - Access Road

**Scenario** #11 - Rolling dip addition

**Scenario Description:**

Installation of one or more rolling dips on an existing road to divert water and provide erosion control. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also will improve the plant productivity, vigor and health and substantially reduce the chance of wild fire. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural or forestry enterprise with an existing access road that has surface erosion causing sediment to enter nearby water bodies. If left in its current condition, it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the overall road bed is functional but is causing sediment transport off the road.

**After Situation:**

Rolling dips are in place to break up the flow of water on the road and reduce or eliminate sediment transport. A properly repaired access road will greatly reduce or eliminate excessive sediment in surface water by reducing uncontrolled sediment transport, reduce soil erosion, and improving drainage of irrigated lands. Pipe culverts installed as part of access road to create or maintain hydrologic connectivity should be covered by either Structures for Water Control (587) (cross drains), Stream Crossings (578) or Fish Passage (396) depending on the type of structure. When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of roadway treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $782.26

**Scenario Cost/Unit:** $7.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 22 | $96.14 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 2 | $129.84 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 2 | $80.32 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 560 - Access Road

**Scenario** #12 - Waterbar addition

**Scenario Description:**

Installation of one or more water bars on an existing road to divert water and provide erosion control. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also will improve the plant productivity, vigor and health and substantially reduce the chance of wild fire. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural or forestry enterprise with an existing access road that has surface erosion causing sediment to enter nearby water bodies. If left in its current condition, it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the overall road bed is functional but is causing sediment transport off the road.

**After Situation:**

Water bars are in place to break up the flow of water on the road and reduce or eliminate sediment transport. A properly repaired access road will greatly reduce or eliminate excessive sediment in surface water by reducing uncontrolled sediment transport, reduce soil erosion, and improving drainage of irrigated lands. Pipe culverts installed as part of access road to create or maintain hydrologic connectivity should be covered by either Structures for Water Control (587) (cross drains), Stream Crossings (578) or Fish Passage (396) depending on the type of structure. When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of roadway treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $548.03

**Scenario Cost/Unit:** $10.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 0.5 | $32.46 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 0.5 | $19.53 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 0.5 | $20.08 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #1 - Reinforced Concrete

**Scenario Description:**

Provide a stable, non-eroding surface by surfacing with reinforced concrete on a sand or gravel foundation to stabilize areas around facilities that are frequently and intensively used by people, animals, or vehicles. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

An area used by animals/equipment has excessive mud and poses a resource concern for soil erosion and water quality. This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Areas around facilities that are frequently and intensively used by people, animals or vehicles are stabilized with a 6" thick reinforced concrete slab with a 6" base of sand or gravel material. Surfacing will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630.0

**Scenario Total Cost:** $3,958.25

**Scenario Cost/Unit:** $6.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 12 | $3,371.64 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 12 | $337.32 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #2 - Non-reinforced Concrete with sand or gravel foundation

**Scenario Description:**

Provide a stable, non-eroding surface by surfacing with non-reinforced concrete on a sand or gravel foundation to stabilize areas around facilities that are frequently and intensively used by people, animals, or vehicles. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

An area used by animals/equipment has excessive mud and poses a resource concern for soil erosion and water quality. This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Areas around facilities that are frequently and intensively used by people, animals or vehicles are stabilized with a 6" thick non-reinforced concrete slab with a 6" base of sand or gravel material. Surfacing will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630.0

**Scenario Total Cost:** $2,248.25

**Scenario Cost/Unit:** $3.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formless, non reinforced | 36 | Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $138.47 | 12 | $1,661.64 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 12 | $337.32 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #3 - Rock/Gravel

**Scenario Description:**

Provide a stable, non-eroding surface by surfacing with rock and/or gravel to stabilize areas around facilities that are frequently and intensively used by people, animals, or vehicles. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

An area used by animals/equipment has excessive mud and poses a resource concern for soil erosion and water quality. This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Areas around facilities that are frequently and intensively used by people, animals or vehicles are stabilized with rock and/or gravel. Practice will address soil erosion and water quality degradation. Typical scenario is for 630 sq ft of surface treated with 8" layer of gravel. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Rock and or Gravel

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630.0

**Scenario Total Cost:** $742.09

**Scenario Cost/Unit:** $1.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 16 | $36.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 16 | $455.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #4 - Rock/Gravel on Geotextile

**Scenario Description:**

Provide a stable, non-eroding surface by surfacing with rock and/or gravel on a geotextile fabric foundation to stabilize areas around facilities that are frequently and intensively used by people, animals, or vehicles. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

An area used by animals/equipment has excessive mud and poses a resource concern for soil erosion and water quality. This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Areas around facilities that are frequently and intensively used by people, animals or vehicles are stabilized with rock and/or gravel on a geotextile fabric foundation material. Practice will address soil erosion and water quality degradation. Typical scenario is for 630 sq ft of surface treated with geotextile and an 8" layer of gravel. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Rock and or Gravel

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630.0

**Scenario Total Cost:** $920.59

**Scenario Cost/Unit:** $1.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 70 | $178.50 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 16 | $36.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 16 | $455.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #5 - Rock/Gravel-GeoCell on Geotextile

**Scenario Description:**

Provide a stable, non-eroding surface by surfacing with rock and/or gravel in a cellular containment grid on a geotextile fabric foundation to stabilize areas around facilities that are frequently and intensively used by people, animals, or vehicles. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

An area used by animals/equipment has excessive mud and poses a resource concern for soil erosion and water quality. This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Areas around facilities that are frequently and intensively used by people, animals or vehicles are stabilized with rock and/or gravel on cellular containment grid with a geotextile fabric foundation material. Practice will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Rock and or Gravel

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630.0

**Scenario Total Cost:** $2,984.97

**Scenario Cost/Unit:** $4.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 70 | $178.50 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 4 | $9.24 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 15.6 | $444.44 |
| GeoCell, 4" | 1054 | 4-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill | Square Yard | $30.05 | 70 | $2,103.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #6 - Sand-topped Rock/Gravel on Geotextile

**Scenario Description:**

Provide a stable, non-eroding surface by surfacing with rock and/or gravel topped with a sand layer on a geotextile fabric foundation to stabilize areas around facilities that are frequently and intensively used by people, animals, or vehicles. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

An area used by animals/equipment has excessive mud and poses a resource concern for soil erosion and water quality. This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Areas around facilities that are frequently and intensively used by people, animals or vehicles are stabilized with rock and/or gravel topped with sand on a geotextile fabric foundation material. Practice will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Rock and or Gravel

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630.0

**Scenario Total Cost:** $1,130.07

**Scenario Cost/Unit:** $1.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 70 | $178.50 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 15.5 | $35.81 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 8 | $224.88 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 15.5 | $441.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #7 - Organic Surfacing

**Scenario Description:**

Provide a stable, non-eroding surface by surfacing with wood chips on a geotextile fabric foundation to stabilize areas around facilities that are frequently and intensively used by people, animals, or vehicles. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

An area used by animals/equipment has excessive mud and poses a resource concern for soil erosion and water quality. This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Areas around facilities that are frequently and intensively used by people, animals or vehicles are stabilized with wood chips on a geotextile fabric foundation material. Practice will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Surfacing

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630.0

**Scenario Total Cost:** $1,012.48

**Scenario Cost/Unit:** $1.61

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 70 | $178.50 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 15.5 | $35.81 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.87 | 24 | $548.88 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #8 - Rock/Gravel Pad in Floodplain

**Scenario Description:**

Stabilization of an area intensively used by animals during frequent times of inundation to create a non-erosive surface. Practice is intended to be contracted only when the landowner doesn't have property out of the flood plain that is accessible by animals. Installation includes raising a protected area so that that treated area does not become saturated and unstable. Note, in many areas a hydraulic analysis and zero rise analysis of the flood plain will be required. An engineer and the county should be consulted as needed.

**Before Situation:**

In grazed fields that are susceptible to flooding and saturation, high areas of fields become eroded and unstable due to the congregating and high traffic of livestock, creating resource concerns related to soil erosion and water quality degradation.

**After Situation:**

Typical scenario is a 100'x100' treated area with a 10-foot thick base. Side slopes are 2.5:1. A raised pad is stable in all conditions, especially when inundation within the grazed field occurs. Geotextile fabric is placed under the protective material for added strength during times of livestock use. Practice addresses soil erosion and water quality degradation. Any needed vegetation of disturbed areas must use Critical Area Planting (342). To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Pad

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 10,000.0

**Scenario Total Cost:** $61,450.12

**Scenario Cost/Unit:** $6.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 1110 | $2,830.50 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 6620 | $28,929.40 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 6620 | $23,765.80 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 24 | $1,558.08 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 6 | $234.36 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 185 | $3,633.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #10 - Bituminous Concrete Pavement (Asphalt)

**Scenario Description:**

Provide a stable, non-eroding surface by surfacing with bituminous concrete pavement (asphalt) on aggregate gravel foundation to stabilize areas around facilities that are frequently and intensively used by people, animals, or vehicles. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

An area used by animals/equipment has excessive mud and poses a resource concern for soil erosion and water quality. This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

The stabilized area is surfaced with approximately 630 square feet of bituminous concrete pavement on 8 cubic yards of aggregate gravel material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Bituminous Pavement

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630.0

**Scenario Total Cost:** $2,138.98

**Scenario Cost/Unit:** $3.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 15.5 | $35.81 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 12 | $341.88 |
| Asphalt, pavement | 1867 | Bituminous Concrete,includes materials, equipment and labor for 4" layer, base not included. | Square Foot | $2.40 | 630 | $1,512.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #11 - Reinforced Concrete, Remote Location

**Scenario Description:**

This scenario provides a stable, non-eroding surface by using reinforced concrete on a sand or gravel foundation to stabilize areas around facilities that are frequently and intensively used by people, animals, or vehicles. This scenario is only available when project site(s) are greater than 30 miles from a concrete batch plant. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

An area used by animals/equipment has excessive mud and poses a resource concern for soil erosion and water quality. This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Areas around facilities that are frequently and intensively used by people, animals or vehicles are stabilized with a 6" thick reinforced concrete slab with a 6" base of sand or gravel material. Surfacing will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630.0

**Scenario Total Cost:** $4,728.96

**Scenario Cost/Unit:** $7.51

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 12 | $3,371.64 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 12 | $337.32 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 1000 | $1,020.00 |

**Practice:** 570 - Stormwater Runoff Control

**Scenario** #1 - Average Slope <= 3%

**Scenario Description:**

This scenario involves installation of silt fence, straw wattles, straw bales, including woven or non woven geotextile on the construction site as part of one conservation engineering system. The combined system shall include two or more components and will address the resource concerns related with concentrated flow erosion, excessive sediment in surface waters as well as protection of existing inlets and structures depending on the combination.

**Before Situation:**

The combination scenario is applicable in all construction sites and watersheds including those in the urban and suburban areas. Which component would apply in a particular situation would depend on the site condition, slope etc.

**After Situation:**

When properly installed, the combination structures slow down runoff flow velocity and reduce high velocity erosion, detain and filter the stormwater runoff and provide a controlled release to the downstream areas. In seeded areas, straw wattles also enable seeds to settle and germinate, aiding the revegetation process. By filtering overland runoff and holding sediment on the slope, Straw Wattles also help to protect lakes, ponds, rivers and streams from sediment pollution. By filtering overland runoff and holding sediment on the slope, geotextile fabrics also help to protect water quality. When properly installed, coconut mats slow and spread the overland water flow and provide a filtering effect. They also help to reduce sediment transport and stabilize the construction area. Silt fence are installed along the downstream perimeter of a construction site to prevent sediment transport off construction areas. A typical silt fence consists of a synthetic filter fabric stretched between a series of fence stakes, with the stakes installed on the downstream side of the perimeter and the fabric trenched into the soil on the upstream side and backfilled. If earthen basins are warranted for water quality improvement purpose, use Sediment Basin (350). If seeding is warranted for water quality and erosion control purpose, use Critical Area Planting (342). Mulching (484) is an associated practice.

**Feature Measure:** Area of construction site

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,485.76

**Scenario Cost/Unit:** $2,485.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 480 | $1,224.00 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1.5 | $32.09 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1.5 | $70.88 |
| **Materials** | | | | | | |
| Silt Fence | 43 | Silt Fence with support post. Includes materials, equipment and labor | Foot | $0.88 | 100 | $88.00 |
| Wattles, straw, 8-9"x25' | 1405 | Tubes of rice straw, approximately 8-9 inch in diameter, 25 feet long . Includes materials and shipping only (including stakes). | Foot | $1.01 | 100 | $101.00 |
| Straw bales | 2186 | Straw bales buried at defined intervals to halt rill and gulley formation. Materials and shipping only. | Each | $5.08 | 135 | $685.80 |

**Practice:** 570 - Stormwater Runoff Control

**Scenario** #2 - Average Slope > 3%

**Scenario Description:**

This scenario involves installation of silt fence, straw wattles, straw bales, including woven or non woven geotextile on the construction site as part of one conservation engineering system. Relatively steep slopes call for down slope and split slope treatments. The combined system shall include two or more components and will address the resource concerns related with concentrated flow erosion, excessive sediment in surface waters as well as protection of existing inlets and structures depending on the combination.

**Before Situation:**

The combination scenario is applicable in all construction sites and watersheds including those in the urban and suburban areas. Which component would apply in a particular situation would depend on the site condition, slope etc.

**After Situation:**

When properly installed, the combination structures slow down runoff flow velocity and reduce high velocity erosion, detain and filter the stormwater runoff and provide a controlled release to the downstream areas. In seeded areas, straw wattles also enable seeds to settle and germinate, aiding the revegetation process. By filtering overland runoff and holding sediment on the slope, Straw Wattles also help to protect lakes, ponds, rivers and streams from sediment pollution. By filtering overland runoff and holding sediment on the slope, geotextile fabrics also help to protect water quality. When properly installed, coconut mats slow and spread the overland water flow and provide a filtering effect. They also help to reduce sediment transport and stabilize the construction area. Silt fence are installed along the downstream perimeter of a construction site to prevent sediment transport off construction areas. A typical silt fence consists of a synthetic filter fabric stretched between a series of fence stakes, with the stakes installed on the downstream side of the perimeter and the fabric trenched into the soil on the upstream side and backfilled. If earthen basins are warranted for water quality improvement purpose, use Sediment Basin (350). If seeding is warranted for water quality and erosion control purpose, use Critical Area Planting (342). Mulching (484) is an associated practice.

**Feature Measure:** Area of construction site

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,971.52

**Scenario Cost/Unit:** $4,971.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 960 | $2,448.00 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 3 | $64.17 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 3 | $141.75 |
| **Materials** | | | | | | |
| Silt Fence | 43 | Silt Fence with support post. Includes materials, equipment and labor | Foot | $0.88 | 200 | $176.00 |
| Wattles, straw, 8-9"x25' | 1405 | Tubes of rice straw, approximately 8-9 inch in diameter, 25 feet long . Includes materials and shipping only (including stakes). | Foot | $1.01 | 200 | $202.00 |
| Straw bales | 2186 | Straw bales buried at defined intervals to halt rill and gulley formation. Materials and shipping only. | Each | $5.08 | 270 | $1,371.60 |

**Practice:** 574 - Spring Development

**Scenario** #1 - Spring Development with Headwall

**Scenario Description:**

Develop a water source from a natural spring or seep (i.e., spring development) to provide water for livestock and/or wildlife needs on sites requiring a structural headwall. This typical scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside), constructing a water collection structure by installing a 50 ft long, 4 inch diameter HDPE perforated pipe enclosed in a sand/gravel envelope overlaid by 2 ft wide filter fabric (50 ft long) and behind a concrete cutoff wall (6 inch x 4 ft height x 25 ft long) to retain water. Water is directed (via 20 ft long, 4 inch PVC) to a spring box (48 inch diameter x 6 ft long CMP) that is located at the cutoff wall or below the wall, equipped with a watertight lid and two outlets. One outlet serves as overflow pipe to account for occasions where inflow exceeds outflow. The collection system is commonly composed of a single or a network of perforated 4 inch diameter drainage pipe placed in an excavated collection trench that runs across the slope. The outflow pipe from the spring box can be directed to buried large storage tank an/or to a watering facility/trough system. Resource Concern: Livestock production limitation - Inadequate livestock water. Associated Practices: 516-Livestock Pipeline; 614-Watering Facility; 382-Fence; Critical Area Planting (342).

**Before Situation:**

Livestock operation with inadequate fresh water for livestock. The operation contains on-site undeveloped spring/seep.

**After Situation:**

Spring development system provides adequate water for the intended use. The system typically runs all year long in most zones.

**Feature Measure:** Number of Developments

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,497.15

**Scenario Cost/Unit:** $4,497.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 2.5 | $1,092.48 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 11 | $28.05 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 16 | $880.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 2 | $56.22 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 2 | $56.98 |
| Pipe, PVC, 4", SCH 40 | 978 | Materials: - 4" - PVC - SCH 40 - ASTM D1785 | Foot | $3.58 | 20 | $71.60 |
| Pipe, HDPE, 4", PCPT, Single Wall | 1270 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only. | Foot | $0.48 | 50 | $24.00 |
| Pipe, CMP, 48", 14 Gauge | 1280 | 48" Corrugated Metal Pipe, Galvanized, Uncoated, 14 gage. Material cost only. | Foot | $41.84 | 6 | $251.04 |
| Spring Collection Box Cover, steel, 4' diameter | 1281 | 4' diameter x 1/4" thick Steel lid with handle for spring collection box. Materials and fabrication. | Each | $178.80 | 1 | $178.80 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 350 | $357.00 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 574 - Spring Development

**Scenario** #2 - Spring Development without Headwall

**Scenario Description:**

Develop a water source from a natural spring or seep (i.e., spring development) to provide water for livestock and/or wildlife needs on sites that do not require a structural headwall. This typical scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside), constructing a water collection structure by installing a 50 ft long, 4 inch diameter HDPE perforated pipe enclosed in a sand/gravel envelope overlaid by 2 ft wide filter fabric (50 ft long) to retain water. Water is directed (via 20 ft long, 4 inch PVC) to a spring box (48 inch diameter x 6 ft long CMP) that is equipped with a watertight lid and two outlets. One outlet serves as overflow pipe to account for occasions where inflow exceeds outflow. The collection system is commonly composed of a single or a network of perforated 4 inch diameter drainage pipe placed in an excavated collection trench that runs across the slope. The outflow pipe from the spring box can be directed to buried large storage tank an/or to a watering facility/trough system. Resource Concern: Livestock production limitation - Inadequate livestock water. Associated Practices: 516-Livestock Pipeline; 614-Watering Facility; 382-Fence; Critical Area Planting (342).

**Before Situation:**

Livestock operation with inadequate fresh water for livestock. The operation contains on-site undeveloped spring/seep.

**After Situation:**

Spring development system provides adequate water for the intended use. The system typically runs all year long in most zones.

**Feature Measure:** Number of Developments

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,962.47

**Scenario Cost/Unit:** $2,962.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 11 | $28.05 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 12 | $660.36 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 12 | $325.44 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 2 | $56.22 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 2 | $56.98 |
| Pipe, PVC, 4", SCH 40 | 978 | Materials: - 4" - PVC - SCH 40 - ASTM D1785 | Foot | $3.58 | 20 | $71.60 |
| Pipe, HDPE, 4", PCPT, Single Wall | 1270 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only. | Foot | $0.48 | 50 | $24.00 |
| Pipe, CMP, 48", 14 Gauge | 1280 | 48" Corrugated Metal Pipe, Galvanized, Uncoated, 14 gage. Material cost only. | Foot | $41.84 | 6 | $251.04 |
| Spring Collection Box Cover, steel, 4' diameter | 1281 | 4' diameter x 1/4" thick Steel lid with handle for spring collection box. Materials and fabrication. | Each | $178.80 | 1 | $178.80 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 350 | $357.00 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 575 - Trails and Walkways

**Scenario** #1 - Trail, Unsurfaced, Level Terrain

**Scenario Description:**

Layout and construct a lane or travel way on level ground without surfacing materials to facilitate animal movement on farmstead areas, pasture or rangeland. Trails and walkways provide or improve access to forage, water, shelter or working/handling facilities; or improve grazing efficiency and distribution; and/or protect ecologically sensitive, erosive and/or potentially erosive sites and address soil erosion and water quality. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practices.

**Before Situation:**

Animals utilize a travelway that is eroding or has excessive soil runoff due to mud or animals are not confined to one stable area and have access to sensitive areas. Active soil erosion is occurring and plant health and vigor is affected.

**After Situation:**

The typical scenario will be for the construction of a new unsurfaced trail or walkway that will be 12 foot wide 300 foot long, 3600 square foot lane. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock. No surface materials are included with this practice. Consider the adequacy of natural surfacing. If the lane is vegetated and requires planting, the vegetation shall be planted according to Critical Area Planting (342). Where vegetation is not practical, and surface protection is needed, refer to Heavy Use Area Protection (561). Stream Crossing (578) will be used when the trail or lane crosses streams or shallow water areas. Consider the use of water bars or culverts to control and direct water flow, use Access Road (560). Diversion (362) may also be beneficial. Fencing (382) will be used when needed to control animal movement.

**Feature Measure:** Area of lane or trail

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 3,600.0

**Scenario Total Cost:** $1,129.06

**Scenario Cost/Unit:** $0.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 6 | $389.52 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 6 | $240.96 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 575 - Trails and Walkways

**Scenario** #2 - Trail, Unsurfaced, Sloping Terrain

**Scenario Description:**

Layout and construct a lane or travel way on ground with a slope of greater than 5% without surfacing materials to facilitate animal movement on farmstead areas, pasture or rangeland. Trails and walkways provide or improve access to forage, water, shelter or working/handling facilities; or improve grazing efficiency and distribution; and/or protect ecologically sensitive, erosive and/or potentially erosive sites and address soil erosion and water quality. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practices.

**Before Situation:**

Animals utilize a travelway that is eroding or has excessive soil runoff due to mud or animals are not confined to one stable area and have access to sensitive areas. Active soil erosion is occurring and plant health and vigor is affected.

**After Situation:**

The typical scenario will be for the construction of a new trail or walkway that will be a 12 foot wide 300 foot long, 3600 square foot lane in sloping terrain. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock in areas where the natural surfacing is adequate. If the lane is vegetated and requires planting, the vegetation shall be planted according to Critical Area Planting (342). Where vegetation is not practical, and surface protection is needed, refer to Heavy Use Area Protection (561). Stream Crossing (578) or Fish Passage (396) will be contracted when the trail or lane crosses streams or shallow water areas. Diversion (362) may also be beneficial. Fencing (382) will be used when needed to control animal movement.

**Feature Measure:** Area of Trail

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 3,600.0

**Scenario Total Cost:** $1,759.54

**Scenario Cost/Unit:** $0.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 12 | $779.04 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 12 | $481.92 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 578 - Stream Crossing

**Scenario** #1 - Culvert, < 3 ft diameter

**Scenario Description:**

Install a CMP culvert with a diameter of less than 3 feet. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and building headwalls. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows.

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

Access road and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Typical scenario is for a 2' diameter Culvert installation. 15' road with 4' of fill over the culvert, 2.5:1 side slopes for a total pipe length of 50'. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** Culvert

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $22,877.27

**Scenario Cost/Unit:** $457.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 25 | $4,036.00 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 40 | $1,751.20 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 10 | $2,136.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 8 | $759.60 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 23 | $898.38 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 82 | $2,328.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 42 | $1,139.04 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 35 | $1,405.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 5 | $236.25 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 42 | $4,744.74 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 4 | $275.32 |
| Pipe, CMP, 14-12 gauge, weight priced | 1589 | 14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.15 | 1200 | $1,380.00 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 578 - Stream Crossing

**Scenario** #2 - Culvert, 3-6 ft diameter

**Scenario Description:**

Install a CMP culvert with a diameter of 3 to 6 feet. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and building headwalls. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows.

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

Access road and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Typical scenario is for a 4' diameter Culvert installation. 15' road with 4' of fill over the culvert, 2.5:1 side slopes for a total pipe length of 50'. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** Culvert

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $25,265.27

**Scenario Cost/Unit:** $505.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 30 | $4,843.20 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 40 | $1,751.20 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 10 | $2,136.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 8 | $759.60 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 23 | $898.38 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 82 | $2,328.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 42 | $1,139.04 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 5 | $236.25 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 42 | $4,744.74 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 4 | $275.32 |
| Pipe, CMP, 14-12 gauge, weight priced | 1589 | 14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.15 | 2400 | $2,760.00 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 578 - Stream Crossing

**Scenario** #3 - Culvert, >6 ft diameter

**Scenario Description:**

Install a CMP culvert with a diameter greater than 6'. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and building headwalls. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Use (396) Aquatic Organism Passage instead when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows.

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

Access road and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Typical scenario is for a 8' diameter Culvert installation. 15' road with 8' of fill over the culvert, 2.5:1 side slopes for a total pipe length of 50'. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** Culvert

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $28,255.95

**Scenario Cost/Unit:** $565.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 35 | $5,650.40 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 45 | $1,970.10 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 10 | $2,136.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 8 | $759.60 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 23 | $898.38 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 82 | $2,328.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 47 | $1,274.64 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 45 | $1,807.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 5 | $236.25 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 42 | $4,744.74 |
| **Materials** | | | | | | |
| Pipe, CMP, 96", 14 Gauge | 1835 | 96" Corrugated Metal Pipe, Galvanized, Uncoated, 14 gage. Material cost only. | Foot | $93.27 | 50 | $4,663.50 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 578 - Stream Crossing

**Scenario** #4 - Culvert, >6 ft diameter, Foundation Modification

**Scenario Description:**

Install a CMP culvert with a diameter greater than 6' in areas where significant foundation modification are required in order for the practice to function as planned. Work includes dewatering, site preparation and removing any old crossing and unsuitable foundation material, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and building headwalls. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Use (396) Aquatic Organism Passage instead when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows.

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

Access road and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable foundation is developed for equipment, people and/or animals to cross. Typical scenario is for a 8' diameter Culvert installation. 15' road with 8' of fill over the culvert, 2.5:1 side slopes for a total pipe length of 50'. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** Culvert

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $38,994.07

**Scenario Cost/Unit:** $779.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 125 | $318.75 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 562 | $3,242.74 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 80 | $12,915.20 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 45 | $1,970.10 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 10 | $2,136.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 8 | $759.60 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 23 | $898.38 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 82 | $2,328.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 47 | $1,274.64 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 45 | $1,807.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 42 | $4,744.74 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 50 | $982.00 |
| Pipe, CMP, 96", 14 Gauge | 1835 | 96" Corrugated Metal Pipe, Galvanized, Uncoated, 14 gage. Material cost only. | Foot | $93.27 | 50 | $4,663.50 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 578 - Stream Crossing

**Scenario** #7 - Bridge, Manufactured

**Scenario Description:**

Installation of a manufactured steel or concrete bridge. Constructed of a manufactured structure, bridges are attached at either end to prefabricated, reinforced and poured-in-place, or piling abutments capped/surrounded with concrete. Bridge decking is timber. Bridge design is completed to conform to loading requirements and site conditions. The bridge deck is designed to rest on abutments placed on the adjacent floodplain. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and building headwalls. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows.

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

The undersized culvert is replaced with a rail car bridge placed on precast concrete abutments. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Typical Scenario is for a 30' span bridge 15' wide on precast concrete abutments. Access road and waterflow are able to cross each other in a stable manner. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** Linear feet of bridge

**Scenario Unit::** Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $69,781.27

**Scenario Cost/Unit:** $2,326.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 18 | $7,865.82 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 40 | $2,201.20 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 20 | $3,228.80 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 50 | $10,682.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 10 | $949.50 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 34 | $1,328.04 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 61 | $1,732.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 51 | $2,048.16 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 21 | $992.25 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Bridge, steel or concrete, pre-Manufactured Bridge | 2193 | A premanufactured steel or precast prestressed concrete bridge rated for an HS 25 highway loading. Typical width is 14', length is variable. Includes railing system. Includes materials and shipping only. | Square Foot | $62.81 | 450 | $28,264.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 578 - Stream Crossing

**Scenario** #8 - Bridge, Manufactured, Foundation Modification

**Scenario Description:**

A channel-spanning structure constructed from a manufactured concrete or steel bridge structure that has been certified by a PE that carries a road or trailway across a river or stream. Bridge design is completed to conform to loading requirements and site conditions. The bridge deck is designed to rest on abutments placed on the adjacent floodplain. Projects located in alluvial, estuarine, or tidally influenced areas, where soils are considered "soft" with low bearing capacity and high potential for settlement or consolidation. These projects typically require a large quantity of over-excavation to remove unsuitable soils, backfill with engineered fill material, and manual compaction to support a new structure for fish passage. Bridge components are delivered to the site and assembled by a combination of equipment and manual labor. They are installed with an assortment of equipment used for excavation, placing material, delivering and removing material, and lifting bridge components from delivery trucks onto the constructed bridge support elements. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert (if applicable), and topsoil conservation for site reclamation. Channel diversion or dewatering is required since an existing blockage will be removed for bridge construction. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the bridge crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. The existing crossing does not meet State or Federal fish passage guidance.

**After Situation:**

The undersized culvert is replaced with a manufactured bridge placed on precast concrete abutments. The bridge deck is composed of concrete or steel and elevated, continuous railings run down each side connecting one abutment to its counterpart on the opposite bank. Signs on either approach indicate bridge capacity and weight restrictions. Because the bridge spans the active channel and sits atop the adjacent floodplain surface, geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. Resource Concerns are addressed within the context of the site. Typical Scenario is for a 30' span bridge 15' wide on precast concrete abutments.

**Feature Measure:** Linear feet of bridge deck

**Scenario Unit::** Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $83,099.48

**Scenario Cost/Unit:** $2,769.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 18 | $7,865.82 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 156 | $900.12 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 80 | $4,402.40 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 20 | $3,228.80 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 50 | $10,682.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 40 | $3,798.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 34 | $1,328.04 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 140 | $5,622.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 120 | $2,356.80 |
| Bridge, steel or concrete, pre-Manufactured Bridge | 2193 | A premanufactured steel or precast prestressed concrete bridge rated for an HS 25 highway loading. Typical width is 14', length is variable. Includes railing system. Includes materials and shipping only. | Square Foot | $62.81 | 450 | $28,264.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 578 - Stream Crossing

**Scenario** #9 - Low water crossing, Hard armor

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using rock riprap or other materials. This scenario includes site preparation, dewatering, acquiring and installing gravel or geotextile with rock riprap or cast in place concrete on channel bottom and approaches. Final travel surface shall be the rocks or concrete. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 30 foot bottom width and approaches. Width is 14 feet for a total area as 420sf. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** Crossing dimensions

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 420.0

**Scenario Total Cost:** $8,556.24

**Scenario Cost/Unit:** $20.37

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 10 | $2,136.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 2 | $189.90 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 18 | $29.52 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 2 | $80.32 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 41 | $4,631.77 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 18 | $1,238.94 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 578 - Stream Crossing

**Scenario** #10 - Low water crossing, Prefabricated products

**Scenario Description:**

To install a stable crossing medium on channel bottom and approaches. Medium includes but not limited to precast concrete blocks, geocells, pavers, and gabions. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 30 foot bottom width and approaches. Width is 14 feet for a total area as 420sf. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

Access road and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** low water crossing

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 420.0

**Scenario Total Cost:** $10,343.58

**Scenario Cost/Unit:** $24.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 10 | $2,136.50 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 2 | $189.90 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 18 | $29.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 41 | $1,164.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 3 | $120.48 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 40 | $4,518.80 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 6 | $168.66 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 18 | $512.82 |
| GeoCell, 4" | 1054 | 4-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill | Square Yard | $30.05 | 50 | $1,502.50 |

**Practice:** 578 - Stream Crossing

**Scenario** #13 - Bridge, Manufactured for Livestock/Pedestrians

**Scenario Description:**

Installation of a manufactured steel, wooden or concrete bridge. Constructed of a manufactured structure, bridges are attached at either end to prefabricated, reinforced concrete, or piling abutments capped/surrounded with concrete. Bridge design is completed to conform to loading requirements for livestock and/or pedestrians and site conditions. The bridge deck is designed to rest on abutments placed on the adjacent floodplain. Work includes dewatering, site preparation and removing pertinent structure(s), acquiring and building abutments. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows.

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

An undersized culvert is replaced with a pre-manufactured bridge placed on precast concrete abutments. Stream flow is not impeded and a stable base exists for people and/or animals to cross. Typical Scenario is for a 30' span bridge 6' wide on precast concrete abutments. Access road and water flow are able to cross each other in a stable manner. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** Linear feet of bridge

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $20,586.94

**Scenario Cost/Unit:** $686.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 15 | $825.45 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 10 | $1,614.40 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $56.50 | 10 | $565.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 30 | $852.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 25 | $1,004.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 25 | $2,824.25 |
| **Materials** | | | | | | |
| Bridge, steel or concrete, pre-Manufactured Bridge | 2193 | A premanufactured steel or precast prestressed concrete bridge rated for an HS 25 highway loading. Typical width is 14', length is variable. Includes railing system. Includes materials and shipping only. | Square Foot | $62.81 | 180 | $11,305.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #2 - Rock Rip Rap, Small

**Scenario Description:**

Protection of streambanks using structural measures such as riprap, concrete block, gabions, etc. to stabilize and protect banks of streams or excavated channels against scour and erosion in areas requiring a 2' thick layer of rock. Logs or rootwads for habitat features or as needed for permitting should be contracted under 395 - Stream Habitat Improvement and Management. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, critical area vegetation, and rock rip rap placed with geotextile. Use associated practice, 484-Mulching, for about 9000 sqft of erosion control blanket (ECB) that is typically needed to stabilize area above the rock toe (or 18sqft of ECB per 1 LnFt of Rip Rap). Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching.

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. Typical scenario is for a 6-foot high vertical bank regraded to 3(H):1(V) slope for 500 linear feet. The rock toe will be 2' thick and 5' high. The bank above the riprap will be graded to a stable slope and revegetated. The entire area is planted with a mix of conifers, woody cuttings and shrubs. Cuttings are planted at a 2' grid spacing in the rip rap area, above this section 500 plants per acre, 30% conifer, 35% willow, 35% shrubs are planted tree protectors are used for all plants For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $34,666.71

**Scenario Cost/Unit:** $69.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 1000 | $4,370.00 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 20 | $1,298.40 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.2 | $2.47 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.21 | 1000 | $4,210.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 84 | $3,281.04 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 105 | $2,982.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 23 | $923.68 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 34 | $1,606.50 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 185 | $12,733.55 |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 750 | $360.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tree, willow | 1426 | Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only. | Each | $0.65 | 30 | $19.50 |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 30 | $50.10 |
| Tree, conifer, seedling or transplant, potted or B&B, 2-3 gal. | 1537 | Potted or balled and burlapped conifer tree, 2-3 gal. Includes materials and shipping only. | Each | $6.90 | 26 | $179.40 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 836 | $1,864.28 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 1 | $37.92 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #3 - Rock Rip Rap, Large

**Scenario Description:**

Protection of streambanks using structural measures such as riprap, concrete block, gabions, etc. to stabilize and protect banks of streams or excavated channels against scour and erosion requiring a 3' thick layer of rock. Logs or rootwads for habitat features or as needed for permitting should be contracted under 395 - Stream Habitat Improvement and Management. . The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, critical area vegetation, and rock rip rap placed with geotextile. Use associated practice, 484-Mulching, for about 9000 sqft of erosion control blanket (ECB) that is typically needed to stabilize area above the rock toe (or 18sqft of ECB per 1 LnFt of Rip Rap). Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching.

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. Typical scenario is for a 6-foot high vertical bank regraded to 3(H):1(V) slope for 500 linear feet. The rock toe will be 3' thick and 5' high. The bank above the riprap will be graded to a stable slope and revegetated. The entire area is planted with a mix of conifers, woody cuttings and shrubs. Cuttings are planted at a 2' grid spacing in the rip rap area, above this section 500 plants per acre, 30% conifer, 35% willow, 35% shrubs are planted tree protectors are used for all plants. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $41,067.90

**Scenario Cost/Unit:** $82.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 1000 | $4,370.00 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 20 | $1,298.40 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.2 | $2.47 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.21 | 1000 | $4,210.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 84 | $3,281.04 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 105 | $2,982.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 23 | $923.68 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 34 | $1,606.50 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 278 | $19,134.74 |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 750 | $360.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tree, willow | 1426 | Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only. | Each | $0.65 | 30 | $19.50 |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 30 | $50.10 |
| Tree, conifer, seedling or transplant, potted or B&B, 2-3 gal. | 1537 | Potted or balled and burlapped conifer tree, 2-3 gal. Includes materials and shipping only. | Each | $6.90 | 26 | $179.40 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 836 | $1,864.28 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 1 | $37.92 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #4 - Bioengineered

**Scenario Description:**

Protection of streambanks consisting of a bioengineered technique comprised of non-structural measures such as soil lifts wrapped in degradable geotextile materials with live stakes and other vegetative measures to stabilize and protect the streambank against scour and erosion. 484-Mulching is paired with this scenario to install the geotextile materials. This typical size assumes 3 soil lifts, 500' long, 1.5 ft high each; 2 types of erosion control blankets per lift (inner and outer); 11.5 ft width of blanket per lift = 34,500 SqFt of erosion control blanket (or 69 SqFt of ECB / LnFt of streambank protection installed). The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, critical area vegetation, livestake, and revetments. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching.

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has moderately degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. Typical scenario is for a 6-foot high bank with three soil lifts for 500 linear feet. Area planted is 500' long by 20' wide ~0.25 acres. Cuttings are planted at a 2' grid spacing in the 'treated' area, above this section 500 plants per acre, 30% conifer, 35% willow, 35% shrubs are planted tree protectors are used for all plants For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $20,498.92

**Scenario Cost/Unit:** $41.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 1250 | $2,887.50 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 1250 | $5,462.50 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 20 | $1,298.40 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.25 | $3.09 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 84 | $3,281.04 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 84 | $2,385.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 24 | $963.84 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 22 | $1,039.50 |
| **Materials** | | | | | | |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 750 | $360.00 |
| Tree, willow | 1426 | Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only. | Each | $0.65 | 30 | $19.50 |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 30 | $50.10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tree, conifer, seedling or transplant, potted or B&B, 2-3 gal. | 1537 | Potted or balled and burlapped conifer tree, 2-3 gal. Includes materials and shipping only. | Each | $6.90 | 26 | $179.40 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 836 | $1,864.28 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 1 | $37.92 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #5 - Bioengineered w/ Logs

**Scenario Description:**

Protection of streambanks consisting of a bioengineered technique comprised of non-structural measures such as soil lifts wrapped in degradable geotextile materials with large wood structures, live stakes and other vegetative measures to stabilize and protect the streambank against scour and erosion. 484-Mulching is paired with this scenario to install the geotextile materials. This typical size assumes 2 soil lifts, 500' long, 1.5 ft high each; 2 types of erosion control blankets (ECB) per lift (inner and outer); 11.5 ft width of blanket per lift = 23,000 SqFt of erosion control blanket (or 46 SqFt of ECB / LnFt of streambank protection installed). The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, critical area vegetation, livestake, rootwads and revetments. Where geotextile materials are needed (to stabilize soil lifts) use 484-Mulching. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching.

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has moderately degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. Typical scenario is for a 6-foot high bank with two soil lifts for 500 linear feet with log structures. Assumes log vanes will be used for bank treatment with habitat logs/rootwads in between structures. 10 Bank protection structures, each made up of 3 logs (one is 30'L X 24"W; 2 are 15'L X 24"W). Habitat structures: 13 logs (25'L X 24"W) to be used as footers for 3/4 of the treated area (375'). 50 logs with rootwads (logs: 20'L X 24"W; rootwad bole: 6-8'W), spaced 8' apart. Log w/rootwad is placed on top of footer log. Cuttings are planted at a 2' grid spacing in the 'treated' area, above this section 500 plants per acre, 30% conifer, 35% willow, 35% shrubs are planted tree protectors are used for all plants For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $90,067.94

**Scenario Cost/Unit:** $180.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 1250 | $2,887.50 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 1250 | $5,462.50 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 20 | $1,298.40 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 73 | $11,785.12 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.25 | $3.09 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 84 | $3,281.04 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 84 | $2,385.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 101 | $4,056.16 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 42 | $1,984.50 |
| **Materials** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 750 | $360.00 |
| Tree, willow | 1426 | Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only. | Each | $0.65 | 30 | $19.50 |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 30 | $50.10 |
| Tree, conifer, seedling or transplant, potted or B&B, 2-3 gal. | 1537 | Potted or balled and burlapped conifer tree, 2-3 gal. Includes materials and shipping only. | Each | $6.90 | 26 | $179.40 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 836 | $1,864.28 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 231 | $53,497.29 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 1 | $37.92 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #6 - Bioengineered, rock toe

**Scenario Description:**

Protection of streambanks consisting of a bioengineered technique comprised of non-structural measures such as soil lifts wrapped in degradable geotextile materials, live stakes, and structural measures such as riprap to stabilize and protect the streambank against scour and erosion. 484-Mulching is paired with this scenario to install the geotextile materials. This typical size assumes 2 soil lifts, 500' long, 1.5 ft high each; 2 types of erosion control blankets (ECB) per lift (inner and outer); 11.5 ft width of blanket per lift = 23,000 SqFt of erosion control blanket (or 46 SqFt of ECB / LnFt of streambank protection installed). Payment cost include shaping bank, critical area vegetation, and rock rip rap. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching.

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. Typical scenario is for a 6-foot high bank with two soil lifts for 500 linear feet. The rock toe will be 2' thick and 5' high, extending below the anticipated scour depth of the streambed. Cuttings are planted at a 2' grid spacing in the rip rap area, above this section 500 plants per acre, 30% conifer, 35% willow, 35% shrubs are planted tree protectors are used for all plants For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $44,735.04

**Scenario Cost/Unit:** $89.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 1351 | $3,120.81 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 1351 | $5,903.87 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 20 | $1,298.40 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 40 | $6,457.60 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.25 | $3.09 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 84 | $3,281.04 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 195 | $5,538.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 34 | $1,365.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 34 | $1,606.50 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 185 | $12,733.55 |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 750 | $360.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tree, willow | 1426 | Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only. | Each | $0.65 | 30 | $19.50 |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 30 | $50.10 |
| Tree, conifer, seedling or transplant, potted or B&B, 2-3 gal. | 1537 | Potted or balled and burlapped conifer tree, 2-3 gal. Includes materials and shipping only. | Each | $6.90 | 26 | $179.40 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 836 | $1,864.28 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 1 | $37.92 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #7 - Large Wood Structures

**Scenario Description:**

Protection of streambanks using discrete structural large wood placement. Large wood structures promote habitat complexity for Endangered Species Act listed aquatic organisms while acting as stream barbs to deflect flow away from eroding streambanks. Large wood also provides increased roughness along banks that are hydraulically efficient; increased roughness reduces near-bank velocities and shear stress. Logs with and without rootwads are embedded in the streambank and stream bed along the eroding stream bank in a variety of configurations; all members are pinned together using rebar and ballasted with large rock. Associated practice, 484-Mulching, is added to install Erosion Control Blanket (ECB) to stabilize bank above wood structure; typically 6 SqFt of ECB per LnFt of treatment. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species while provide bank stabilization. Payment cost include shaping bank, critical area vegetation, live stakes, rootwads, logs, ballast rock and hauling: Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 500-Obstruction Removal; 584-Channel Bed Stabilization; 484-Mulching.

**Before Situation:**

A stream has moderately degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. Typical scenario is for a 6-foot high bank at 3(H):1(V) slope for 100 linear feet with wood structures spaced 50 ft apart is used for estimation purposes. Tree and shrub plantings are also included at a rate of 500 plants per acre, 30% conifer, 35% willow, 35% shrubs plus tree protectors. Area planted is 100' long by 20' wide ~0.05 acres Cuttings are planted at a 2' grid spacing in the lower 5', above this section 500 plants per acre, 30% conifer, 35% willow, 35% shrubs are planted tree protectors are used for all plants For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat. Installation of large wood structures provides improved habitat complexity for target fish species.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $26,033.59

**Scenario Cost/Unit:** $260.34

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 80 | $461.60 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 32 | $3,573.12 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.21 | 320 | $1,347.20 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 3750 | $1,200.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 98 | $3,827.88 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 38 | $1,526.08 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 40 | $1,261.60 |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 150 | $72.00 |
| Tree, willow | 1426 | Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only. | Each | $0.65 | 7 | $4.55 |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 7 | $11.69 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tree, conifer, seedling or transplant, potted or B&B, 2-3 gal. | 1537 | Potted or balled and burlapped conifer tree, 2-3 gal. Includes materials and shipping only. | Each | $6.90 | 6 | $41.40 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 170 | $379.10 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 50 | $11,579.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #8 - Large Wood Structure with rock toe

**Scenario Description:**

Protection of streambanks using discrete structural large wood placement on a constructed rock toe. This scenario is appropriate for larger stream systems where the bankfull height is greater than 12 ft. Construction of a rock toe requires working closely with permitting agencies during the planning and design phases. Large wood structures promote habitat complexity for ESA listed aquatic organisms while acting as stream barbs to deflect flow away from eroding streambanks. Large wood also provides increased roughness along banks that are hydraulically efficient; increased roughness reduces near-bank velocities and shear stress. Logs with and without rootwads are embedded in the streambank and stream bed along the eroding stream bank in a variety of configurations; all members are pinned together using rebar and ballasted with large rock. Environmental benefits derived from large wood structures include diverse, complex, and productive aquatic habitats, shade, thermal and velocity refugia, organic additions to the stream, cover for fish, and improvements in aesthetic value and water quality. Installation of plantings along the riparian corridor, and installation clump plantings and live stakes within and around the wood structures are all important components of large term success of wood structures. Associated practice, 484-Mulching, is added to install Erosion Control Blanket (ECB) to stabilize bank above wood structure; typically 6 SqFt of ECB per LnFt of treatment. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species while provide bank stabilization. Payment cost include shaping bank, critical area vegetation, live stakes, angular rock, geotextile fabric, rootwads, logs, ballast rock and hauling: a 12-foot high bank at 1.5(H):1(V) slope for 100 linear feet with wood structures spaced 50 ft apart with 100 ft of rock toe is used for estimation purposes. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 500 Obstruction Removal; 584-Channel Bed Stabilization; 484-Mulching.

**Before Situation:**

A stream has moderately degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat. Installation of large wood structures provides improved habitat complexity for target fish species.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $41,007.11

**Scenario Cost/Unit:** $410.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 80 | $461.60 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 40 | $4,466.40 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.21 | 320 | $1,347.20 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 3750 | $1,200.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 99 | $3,866.94 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 46 | $1,847.36 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 475 | $14,981.50 |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 150 | $72.00 |
| Tree, willow | 1426 | Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only. | Each | $0.65 | 7 | $4.55 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 7 | $11.69 |
| Tree, conifer, seedling or transplant, potted or B&B, 2-3 gal. | 1537 | Potted or balled and burlapped conifer tree, 2-3 gal. Includes materials and shipping only. | Each | $6.90 | 6 | $41.40 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 170 | $379.10 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 50 | $11,579.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #9 - Log Matrix

**Scenario Description:**

Protection of streambanks using a vegetated log matrix, which is comprised of pinned large wood base members, deflector rootwads, and a well-graded mix of logs, sticks, slash and woody debris. Structure is ballasted with large boulders and backfilled using material excavated from stream bed and banks and imported angular rock 6" minus. Large wood structures promote habitat complexity for ESA listed aquatic organisms while acting as stream barbs to deflect flow away from eroding streambanks. Large wood also provides increased roughness along banks that are hydraulically efficient; increased roughness reduces near-bank velocities and shear stress. Logs with and without rootwads are embedded in the streambank and stream bed along the eroding stream bank in a variety of configurations; all members are pinned together using rebar and ballasted with large rock. Environmental benefits derived from large wood structures include diverse, complex, and productive aquatic habitats, shade, thermal and velocity refugia, organic additions to the stream, cover for fish, and improvements in aesthetic value and water quality. Installation of plantings along the riparian corridor, and installation clump plantings and live stakes within and around the log matrix are all important components of large term success. Associated practice, 484-Mulching, is added to install Erosion Control Blanket (ECB) to stabilize bank above wood structure; typically 6 SqFt of ECB per LnFt of treatment. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species while provide bank stabilization. Payment cost include shaping bank, critical area vegetation, live stakes, rootwads, logs, ballast rock and hauling: a 6-foot high bank at 3(H):1(V) slope for 100 linear feet with wood installed over the entire 100 ft section. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 500-Obstruction Removal; 584-Channel Bed Stabilization; 484-Mulching.

**Before Situation:**

A stream has moderately degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat. Installation of large wood structures provides improved habitat complexity for target fish species.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $52,455.65

**Scenario Cost/Unit:** $524.56

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 80 | $461.60 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 80 | $8,932.80 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.21 | 500 | $2,105.00 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 6250 | $2,000.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 114 | $4,452.84 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 86 | $3,453.76 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 70 | $1,374.80 |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 105 | $3,311.70 |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 900 | $432.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tree, willow | 1426 | Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only. | Each | $0.65 | 6 | $3.90 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 906 | $2,020.38 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 100 | $23,159.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 582 - Open Channel

**Scenario** #1 - Excavation, Normal conditions

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 6' deep x 15' wide bottom x 100' length with a side slope of 2.5:1. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Conditions are normal. Normal conditions include: a location easily accessible from a main road, soils without large rock or difficult clay to excavate, and/or other aspects that are average compared to excavation work in the area. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

A stream or channel with active streambank erosion or headcuts and inadequate capacity to handle the flow needed for flood prevention, drainage or erosion prevention.

**After Situation:**

An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Flooding and erosion is no longer a resource concern.

**Feature Measure:** Volume of earth excavated in CY's

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $1,404.29

**Scenario Cost/Unit:** $2.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 500 | $1,155.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 582 - Open Channel

**Scenario** #2 - Excavation, Difficult conditions

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 6' deep x 15' wide bottom x 100' length with a side slope of 2.5:1. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Conditions are difficult. Difficult conditions include: a location that requires a significant drive off the main road, soils with large rock or difficult clay to excavate, and/or other aspects that create difficulty in excavation compared to similar work in the area. Construction may include vegetation and/or a lightly armored bank toe. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

A stream or channel with active streambank erosion or headcuts and inadequate capacity to handle the flow needed for flood prevention, drainage or erosion prevention.

**After Situation:**

An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Flooding and erosion is no longer a resource concern.

**Feature Measure:** Volume of earth excavated in CY's

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $2,009.49

**Scenario Cost/Unit:** $4.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 500 | $1,155.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 582 - Open Channel

**Scenario** #3 - Excavation and Fill, Normal conditions

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 6' deep x 15' wide bottom x 100' length with a side slope of 2.5:1. Excavation and earth fill is required. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Conditions are normal. Normal conditions include: a location easily accessible from a main road, soils without large rock or difficult clay to excavate, and/or other aspects that are average compared to excavation work in the area. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

A stream or channel with active streambank erosion or headcuts and inadequate capacity to handle the flow needed for flood prevention, drainage or erosion prevention.

**After Situation:**

An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Some fill was used to complete the channel shape. Flooding and erosion is no longer a resource concern.

**Feature Measure:** Volume of earth excavated in CY's

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $3,589.29

**Scenario Cost/Unit:** $7.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 500 | $1,155.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 500 | $2,185.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 582 - Open Channel

**Scenario** #4 - Excavation and Fill, Difficult conditions

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 6' deep x 15' wide bottom x 100' length with a side slope of 2.5:1. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Excavation and earth fill is required. Conditions are difficult. Difficult conditions include: a location that requires a significant drive off the main road, soils with large rock or difficult clay to excavate, and/or other aspects that create difficulty in excavation compared to similar work in the area. Construction may include vegetation and/or a lightly armored bank toe. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

A stream or channel with active streambank erosion or headcuts and inadequate capacity to handle the flow needed for flood prevention, drainage or erosion prevention.

**After Situation:**

An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Some fill was used to complete the channel shape. Flooding and erosion is no longer a resource concern.

**Feature Measure:** Volume of earth excavated in CY's

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $4,194.49

**Scenario Cost/Unit:** $8.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 500 | $1,155.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 500 | $2,185.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 582 - Open Channel

**Scenario** #5 - Excavation, Fill removal

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface on a site requiring that all fill be removed and disposed of off site. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Conditions are normal. Normal conditions include: a location easily accessible from a main road, soils without large rock or difficult clay to excavate, and/or other aspects that are average compared to excavation work in the area. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

A stream or channel with active streambank erosion or headcuts and inadequate capacity to handle the flow needed for flood prevention, drainage or erosion prevention.

**After Situation:**

An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Flooding and erosion is no longer a resource concern. Typical construction dimensions are 6' deep x 15' wide bottom x 100' length with a side slope of 2.5:1. Fill is hauled 8 miles to a disposal site, dumped, spread and compacted.

**Feature Measure:** Volume of earth excavated in CY's

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $6,672.87

**Scenario Cost/Unit:** $13.35

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 500 | $1,155.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 500 | $2,185.00 |
| Excavation, clay, large equipment, 50 ft | 1218 | Bulk excavation of clay with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.61 | 500 | $1,305.00 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 4000 | $1,280.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 582 - Open Channel

**Scenario** #6 - Wetland channel construction

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface in marshy or wetland sites. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Excavation and earth fill is required. Construction may include vegetation and/or a lightly armored bank toe. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

A stream or channel with active streambank erosion or headcuts and inadequate capacity to handle the flow needed for flood prevention, drainage or erosion prevention.

**After Situation:**

An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Some fill was used to complete the channel shape. Flooding and erosion is no longer a resource concern. Typical construction dimensions are 6' deep x 15' wide bottom x 100' length with a side slope of 2.5:1.

**Feature Measure:** Volume of earth excavated in CY's

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $5,970.81

**Scenario Cost/Unit:** $11.94

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 500 | $1,155.00 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 30 | $1,947.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 27 | $766.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 32 | $1,285.12 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 12 | $567.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 582 - Open Channel

**Scenario** #7 - Extreme Road Fill

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface in sites with a large amount of fill that will need to be removed. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Excavation and earth fill is required. Construction may include vegetation and/or a lightly armored bank toe. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

A stream or channel with a large fill blocking the channel making the channel unstable.

**After Situation:**

An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Some fill was used to complete the channel shape. Flooding and erosion is no longer a resource concern. Typical construction dimensions are 15' deep with a 6' bottom width and 60' length with an average side slope of 2.5:1 (note, slopes may be steeper in sections, however benches will need to be cut for equipment access, so 2.5:1 is used for the average). 60% of the material is hauled 2 miles off site, 40% is regraded on the site

**Feature Measure:** Volume of earth excavated in CY's

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $14,007.77

**Scenario Cost/Unit:** $28.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 1350 | $3,118.50 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 540 | $2,359.80 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 40 | $6,457.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 16 | $756.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 584 - Channel Bed Stabilization

**Scenario** #1 - Spawning Riffles

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using gravel and boulders to create hard point riffles with a floodplain and low flow channel. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting.

**Before Situation:**

Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Stream cannot be feasibly controlled with clearing and snagging, vegetation, bank protection or upstream water control. Associated practices could include (326) Clearing and Snagging, (396 ) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

A stable channel with spaced spawning riffles is created. Scour is stabilized. Typical scenario is for a 24x31' section of channel.

**Feature Measure:** Area of riffles

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 744.0

**Scenario Total Cost:** $19,125.69

**Scenario Cost/Unit:** $25.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 69 | $398.13 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 5 | $324.60 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 25 | $5,341.25 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 7 | $273.42 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 82 | $9,263.54 |
| **Materials** | | | | | | |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 1 | $34.95 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 69 | $1,649.10 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 584 - Channel Bed Stabilization

**Scenario** #2 - Channel Spanning log jams

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using channel spanning log jams at the base of the channel to stabilize the channel bed.

**Before Situation:**

Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Changes cannot be controlled feasibly with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

Stream channel is stable. A series of channel spanning log jams are installed. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Other associated practices could be (326) Clearing and Snagging, (396 ) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Area to be stabilized.

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 575.0

**Scenario Total Cost:** $32,739.09

**Scenario Cost/Unit:** $56.94

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 80 | $461.60 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 25 | $5,341.25 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.21 | 320 | $1,347.20 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 18 | $703.08 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 32 | $1,285.12 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 86 | $9,715.42 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 40 | $1,261.60 |
| Erosion Control Blanket, biodegradable | 1213 | Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only. | Square Yard | $1.32 | 70 | $92.40 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 50 | $11,579.50 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 584 - Channel Bed Stabilization

**Scenario** #3 - Log Weirs

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using engineered log weir structures. This includes but not limited to toe wood, log weirs, log vanes, root wads, log step pools, etc. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting.

**Before Situation:**

Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Changes cannot be controlled feasibly with clearing and snagging, vegetation, bank protection or upstream water control. Existing channel banks are vertical or near vertical. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

Stream channel is stable. Typical stream has 8 foot bottom width and 5 foot banks. Length of area 100 feet. Structures spaced at 50 foot intervals. Structure uses 2 layers of logs, 2.5' diameter each spanning the channel and placed into the bank 3' on each side at a 45 degree angle upstream. A 3' rock riprap layer is placed on the banks for stability and ballast. Logs are pinned together with rebar, geotextile is placed upstream of the structure for 10' and wrapped around the base log layer with 5' of channel rock placed on top of it. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Other associated practices could be (326) Clearing and Snagging, (396 ) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Number of structures

**Scenario Unit::** Each

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $18,785.97

**Scenario Cost/Unit:** $6,261.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 27 | $68.85 |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 10 | $1,905.90 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 25 | $5,341.25 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 376 | $616.64 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 7 | $273.42 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 11 | $312.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 11 | $441.76 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 11 | $1,242.67 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 53 | $3,647.99 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.53 | 245 | $129.85 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 67 | $1,601.30 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 8.5 | $1,968.52 |

**Mobilization**

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 584 - Channel Bed Stabilization

**Scenario** #4 - Rock Structure

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using engineered rock structures. This includes but not limited to rock drop structures, J hook vanes and other rock structures in channels. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting.

**Before Situation:**

Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Changes cannot be controlled feasibly with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

Stream channel is stable. Typical stream has 50 foot bottom width and 6 foot banks. Length of area 100 feet. Structures spaced at 50 foot intervals. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Other associated practices could be (326) Clearing and Snagging, (396 ) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Number of structures

**Scenario Unit::** Each

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $27,295.99

**Scenario Cost/Unit:** $9,098.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 27 | $68.85 |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 10 | $1,905.90 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 25 | $5,341.25 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 10 | $949.50 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 376 | $616.64 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 7 | $273.42 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 22 | $883.52 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 9 | $425.25 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |
| **Materials** | | | | | | |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 360 | $12,582.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 67 | $1,601.30 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 584 - Channel Bed Stabilization

**Scenario** #5 - Roughened Channel

**Scenario Description:**

Roughened channels, rock ramps, or bypass channels, are constructed features that provide passage around an instream barrier or in place of a removed barrier. Roughened Channels are constructed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Removed materials are trucked away and disposed or recycled off-site, unless excavated native streambed material can be used in fishway construction. Scenario does not include additional measures needed in the active channel and floodplain or at an existing dam necessary to control flow associated with nature-like fishway. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, 580 Streambank and Shoreline Protection, (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control580 Streambank and Shoreline Protection

**Before Situation:**

An instream structure or natural feature has caused channel scour and a channel drop or unstable channel section.

**After Situation:**

A roughened channel is constructed in place to stabilize the channel and restore channel function. Resource Concerns are addressed within the context of the site. Typical scenario is for a 20' wide by 200' long roughened channel.

**Feature Measure:** Square feet of constructed fishway

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,000.0

**Scenario Total Cost:** $87,241.41

**Scenario Cost/Unit:** $21.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $307.21 | 3 | $921.63 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 80 | $4,402.40 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 40 | $6,457.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 100 | $4,378.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 25 | $5,341.25 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 80 | $7,596.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 92 | $3,593.52 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 72 | $2,044.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 91 | $3,654.56 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 72 | $3,402.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 52 | $5,874.44 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 400 | $12,616.00 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 60 | $2,097.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 990 | $23,661.00 |

**Mobilization**

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 585 - Stripcropping

**Scenario** #1 - Stripcropping - wind and water erosion

**Scenario Description:**

This scenario describes the implementation of a strip cropping system that is designed specifically for the control of wind and water erosion or minimizing the transport of sediments or other water borne contaminants originating from runoff on cropland. The planned strip cropping system will meet the current 585 standard. Implementation will result in alternating strips of erosion susceptible crops with erosion resistant crops that are oriented as close to perpendicular to water flows as possible. The designed system will reduce erosion/sediment/contaminants to desired objectives. The scenario includes the costs of designing the system, installing the strips on the landscape appropriately, and integrating a crop rotation that includes water erosion resistant species.

**Before Situation:**

In this geographic area, excessive water erosion is caused by raising crops in a manner that allows sheet water flows to travel down the slope causing sheet and rill erosion or concentrated flow conditions, degradation of soil health through loss of topsoil and organic matter, along with offsite negative impacts to water quality and aquatic wildlife habitat.

**After Situation:**

A strip cropping system that includes at least two or more strips within the planning slope will be designed to include parallel strips of approximately equal widths of water erosion resistant crop species with non-water erosion resistant crop species. Widths will be determined using current water erosion prediction technology to meet objectives. The design and implementation of a stripcropping system will minimize wind, sheet and rill erosion, protect soil quality, reduce offsite sedimentation, and benefit offsite aquatic wildlife habitat. Erosion prediction before and after practice application will be recorded showing the design and benefits of the practice. Erosion resistant strips in rotation must be managed to maintain the planned vegetative cover and surface roughness.

**Feature Measure:** area of strips

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $149.37

**Scenario Cost/Unit:** $1.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 3 | $64.17 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 3 | $85.20 |

**Practice:** 587 - Structure for Water Control

**Scenario** #1 - Flashboard Riser, Metal

**Scenario Description:**

A Flashboard Riser fabricated of metal and used in a water management system that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concerns: Inadequate Water - Inefficient use of Irrigation Water and Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at the embankment. They are often fabricated from vertical pipes with the stoplogs are located in the middle (i.e. Full-Rounds) or sheet steel in a box shape. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a "Half-Round" flashboard riser shop fabricated using a longitudinal cut 36" smooth steel pipe, a 50' long - 30" outlet pipe passing through an embankment.

**Before Situation:**

The operator presently flood irrigates his field and has no means to accurately maintain a constant water level at varying elevations resulting in a lack of flexibility, and inefficient use of water and energy during pumping. The operator also desires to maintain a permanent pool for water fowl during the winter.

**After Situation:**

The operator has the capability to more efficiently control and maintain a range of water surface elevations thereby reducing the flow rate needed. Less water is wasted and both water and energy is conserved. The operator is now able to maintain adequate water during the winter as a benefit to waterfowl. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Irrigation Water Management (449), Irrigation Land Leveling (464), Irrigation Canal or Lateral (320), Irrigation System, Tailwater Recovery (447), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Diameter Inch Foot

**Scenario Unit::** Diameter Inch Foot

**Scenario Typical Size:** 1,800.0

**Scenario Total Cost:** $14,159.20

**Scenario Cost/Unit:** $7.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 190 | $830.30 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 8 | $893.28 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 16 | $3,418.40 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 32 | $3,615.04 |
| **Materials** | | | | | | |
| Pipe, Steel, 30", Std Wt, USED | 1361 | Materials: - USED - 30" - Steel Std Wt | Foot | $79.47 | 50 | $3,973.50 |
| Pipe, Steel, 36", Std Wt, USED | 1362 | Materials: - USED - 36" - Steel Std Wt | Foot | $101.47 | 6 | $608.82 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 587 - Structure for Water Control

**Scenario** #2 - Commercial Inline Flashboard Riser

**Scenario Description:**

An Inline Water Control Structure (WCS) composed of plastic that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concern: Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at point along a pipe extending through an embankment, providing ease of access to the structure and provide better protection against beaver activity. There are commercially available models composed of plastic that are commonly used when the width of the is 24" or less. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a using a such a commercial product. The typical scenario is an inline structure with a width of 20", height of six feet, The pipe is 50' of 15" SCH 40 PVC (inlet and outlet combined).

**Before Situation:**

The landowner wishes to provide for a way to control the water surface elevation in a wetland area. The landowner wishes to enhance and enlarge the area to provide habitat for fish and wildlife.

**After Situation:**

A WCS is installed in a flow line allowing shallow water impoundments. A wetland area is enhanced and water levels can be varied to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Diameter Inch Foot

**Scenario Unit::** Diameter Inch Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $11,305.59

**Scenario Cost/Unit:** $11.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 185 | $808.45 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 4 | $246.36 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 8 | $1,709.20 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 40 | $4,518.80 |
| **Materials** | | | | | | |
| Pipe, PVC, 16", SCH 80 | 1353 | Materials: - 16" - PVC - SCH 80 - ASTM D1785 | Foot | $51.05 | 50 | $2,552.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |

**Practice:** 587 - Structure for Water Control

**Scenario** #3 - Culvert, <30 inches, HDPE

**Scenario Description:**

Install a new HDPE culvert under 30 inches in diameter to convey water under roads or other barriers. A typical scenario would be an 24 inch diameter pipe, 40 feet in length. Work includes site preparation, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and riprap protection of side slopes. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic. Use (578) Stream Crossing for culverts ≥ 30 inches or perennial flow.

**Before Situation:**

Water flow needs to be conveyed under an access road, ditch or other barrier. Water must be conveyed in a controlled fashion.

**After Situation:**

Water is conveyed in a controlled manner. Associated practices could be Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).

**Feature Measure:** Diameter Inch Foot

**Scenario Unit::** Diameter Inch Foot

**Scenario Typical Size:** 960.0

**Scenario Total Cost:** $9,057.59

**Scenario Cost/Unit:** $9.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 5 | $11.55 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 45 | $259.65 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 10 | $2,136.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 14 | $397.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 40 | $4,518.80 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 2 | $137.66 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 5 | $142.45 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 24" | 1246 | Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $23.87 | 40 | $954.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 587 - Structure for Water Control

**Scenario** #4 - Culvert, >= 30 inches, HDPE

**Scenario Description:**

Install a new HDPE culvert over 30 inches in diameter to convey water under roads or other barriers. A typical scenario would be an 48 inch diameter pipe, 40 feet in length. Work includes site preparation, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and riprap protection of side slopes. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic. Check to see if (578) Stream Crossing applies for perennial flow.

**Before Situation:**

Water flow needs to be conveyed under an access road, ditch or other barrier. Water must be conveyed in a controlled fashion.

**After Situation:**

Water is conveyed in a controlled manner. Associated practices could be Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).

**Feature Measure:** Diameter Inch Foot

**Scenario Unit::** Diameter Inch Foot

**Scenario Typical Size:** 1,920.0

**Scenario Total Cost:** $16,177.24

**Scenario Cost/Unit:** $8.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 45 | $259.65 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 24 | $2,679.84 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 16 | $3,418.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 24 | $963.84 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 40 | $4,518.80 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 4 | $275.32 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 9 | $256.41 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 48" | 1249 | Pipe, Corrugated HDPE Double Wall, 48" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $59.94 | 40 | $2,397.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 587 - Structure for Water Control

**Scenario** #5 - Culvert, <30 inches, CMP

**Scenario Description:**

Install a new Corrugated Metal Pipe (CMP) culvert under 30 inches in diameter to convey water under roads or other barriers. A typical scenario would be an 24 inch diameter pipe, 40 feet in length. Work includes site preparation, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and riprap protection of side slopes. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic. Use (578) Stream Crossing instead for culverts ≥ 30 inches or perennial flow.

**Before Situation:**

Water flow needs to be conveyed under an access road, ditch or other barrier. Water must be conveyed in a controlled fashion.

**After Situation:**

Water is conveyed in a controlled manner. Associated practices could be Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).

**Feature Measure:** Diameter Inch Foot

**Scenario Unit::** Diameter Inch Foot

**Scenario Typical Size:** 960.0

**Scenario Total Cost:** $9,253.59

**Scenario Cost/Unit:** $9.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 5 | $11.55 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 45 | $259.65 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 10 | $2,136.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 14 | $397.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 40 | $4,518.80 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 2 | $137.66 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 5 | $142.45 |
| Pipe, CMP, 24", 12 Gauge | 1417 | 24" Corrugated Metal Pipe, Galvanized, Uncoated, 12 gage. Material cost only. | Foot | $28.77 | 40 | $1,150.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 587 - Structure for Water Control

**Scenario** #6 - Culvert, >= 30 inches, CMP

**Scenario Description:**

Install a new Corrugated Metal Pipe (CMP) culvert 30 inches or more in diameter to convey water under roads or other barriers. A typical scenario would be an 48 inch diameter pipe, 40 feet in length. Work includes site preparation, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and riprap protection of side slopes. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic. Check to see if (578) Stream Crossing applies for perennial flow.

**Before Situation:**

Water flow needs to be conveyed under an access road, ditch or other barrier. Water must be conveyed in a controlled fashion. This could be through other pipes or pumping plants.

**After Situation:**

Water is conveyed in a controlled manner. Associated practices could be Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Pumping Plant (533), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).

**Feature Measure:** Diameter Inch Foot

**Scenario Unit::** Diameter Inch Foot

**Scenario Typical Size:** 1,920.0

**Scenario Total Cost:** $14,206.14

**Scenario Cost/Unit:** $7.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 45 | $259.65 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 24 | $2,679.84 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 10 | $2,136.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 24 | $963.84 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 40 | $4,518.80 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 4 | $275.32 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 9 | $256.41 |
| Pipe, CMP, 36", 12 Gauge | 1825 | 36" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only. | Foot | $42.71 | 40 | $1,708.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 587 - Structure for Water Control

**Scenario** #7 - V-Notch Gate Valve

**Scenario Description:**

This scenario is the installation of a V-notch gate valve to control the conveyance of liquid manure. The typical size is up to 12" diameter opening. The gate valve is installed in a pipeline. This scenario assists in addressing the resource concerns: manure and nutrient management.

**Before Situation:**

A pipeline is in need of a gate valve to control the flow of liquid manure

**After Situation:**

A 12" V-notch gate valve gate is installed.

**Feature Measure:** Each Gate Valve

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,752.70

**Scenario Cost/Unit:** $3,752.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| **Materials** | | | | | | |
| Valve, V-notch Gate Valve | 1955 | V-notch Gate Valve used to throttle low liquid manure flows without plugging typical diameter of 12". Materials only. | Each | $3,674.58 | 1 | $3,674.58 |

**Practice:** 587 - Structure for Water Control

**Scenario** #8 - Cast-iron Screw Gate

**Scenario Description:**

This scenario is the installation of a permanent cast-iron screw gate structure to control the conveyance of water. The typical size is a 4 foot diameter opening. The screw gate may be installed on an open channel or pipeline. The gate is made of cast-iron and has a hand operated mechanical lifting system, i.e. screw. This scenario assists in addressing the resource concerns: water management. Conservation practices that may be associated are: 533-Pumping Plant.

**Before Situation:**

A channel or pipeline is in need of a head gate to control the flow of water.

**After Situation:**

A 4 foot diameter cast-iron screw gate is installed and operated by hand is installed.

**Feature Measure:** diameter

**Scenario Unit::** Foot

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $17,187.59

**Scenario Cost/Unit:** $4,296.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 24 | $5,127.60 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 40 | $4,518.80 |
| **Materials** | | | | | | |
| Screw gate, cast iron, 4' diameter, 10/0 head | 1746 | 4' diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Includes materials only. | Each | $6,779.67 | 1 | $6,779.67 |

**Practice:** 587 - Structure for Water Control

**Scenario** #9 - Flap Gate

**Scenario Description:**

This scenario is the installation of a permanent flap (tide) gate structure to control the direction of flow resulting from tides or high water or back-flow from flooding. The typical size is a 4' diameter opening. The gate may be installed on an open channel or pipeline. It is made of steel and operates automatically. This scenario assists in addressing the resource concerns: water management. Conservation practices that may be associated are:

**Before Situation:**

A wetland or other area is in need of a flap gate to control the direction of the water.

**After Situation:**

A flap gate 4' wide is installed.

**Feature Measure:** Feet Diameter (of Gate)

**Scenario Unit::** Foot

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $14,103.83

**Scenario Cost/Unit:** $3,525.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 6 | $330.18 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 20 | $4,273.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 6 | $240.96 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 40 | $4,518.80 |
| **Materials** | | | | | | |
| Flap gate, aluminum, 4' diameter | 2120 | 4' diamerter flap gate constructed from aluminum, materials only | Each | $4,115.93 | 1 | $4,115.93 |

**Practice:** 587 - Structure for Water Control

**Scenario** #10 - Flap Gate w/ Concrete Wall

**Scenario Description:**

Install a concrete cut off wall with tide gate at the outlet of a channel. A typical scenario would be installed in a 25 foot channel, 6 foot deep, with 2:1 side slopes. A concrete wall will extend 10 feet on each side, and include a 4' flap gate structure to control flooding. Work includes site preparation, forming and pouring concrete, backfilling and acquiring and installing the tide gate.

**Before Situation:**

Tides or flooding inundate and affect water quality of wetlands or other managed systems.

**After Situation:**

Tide or flood inundation is controlled. Associated practices could be Aquaculture Ponds (397), Aquatic Organism Passage (396), Bivalve Aquaculture Gear and Biofouling Control (400), Constructed Wetland (656), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Field Ditch (388), Irrigation System, Surface and Subsurface (443), Irrigation Water Management (449), Salinity and Sodic Soil Management (610), Subsurface Drain (606), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), Wetland Creation (658), Wetland Enhancement (659), Wetland Restoration (657), and Wetland Wildlife Habitat Management (644).

**Feature Measure:** Cubic Yards of Concrete

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $19,224.65

**Scenario Cost/Unit:** $1,922.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 10 | $4,369.90 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 200 | $462.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 200 | $874.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 20 | $4,273.00 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 40 | $4,518.80 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 4 | $112.44 |
| Flap gate, aluminum, 4' diameter | 2120 | 4' diamerter flap gate constructed from aluminum, materials only | Each | $4,115.93 | 1 | $4,115.93 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 587 - Structure for Water Control

**Scenario** #11 - Self Regulating Tidegate

**Scenario Description:**

This scenario is the installation of a self regulating tide/flood gate (SRT) structure to control the direction of flow resulting from tides or high water or back-flow from flooding while providing access to fish across a wider range of flow conditions. This is for the gate and SRT controller only, not the pipe or any associated work. This scenario assists in addressing the resource concerns: water management. Conservation practices that may be associated are: Open Channel, Access Road, Aquatic Organism Passage

**Before Situation:**

A wetland or other area is in need of a flap gate to control the direction of the water.

**After Situation:**

A SRT flap gate 4' wide is installed. The gate may be installed on an open channel or pipeline. It is made of steel and operates automatically.

**Feature Measure:** Feet Diameter (of Gate)

**Scenario Unit::** Foot

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $74,701.93

**Scenario Cost/Unit:** $18,675.48

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 40 | $6,457.60 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 50 | $10,682.50 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 80 | $3,124.80 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 100 | $2,840.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Self Regulating Tide gate and controller | 2194 | A 4' diameter stainless steel self regulating tide/flood gate with a controller/ dual float system. Includes materials and shipping only. | Each | $38,564.45 | 1 | $38,564.45 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 587 - Structure for Water Control

**Scenario** #12 - Rock Checks for Water Surface Profile

**Scenario Description:**

Typical setting is in a stream that has become incised and is therefore disconnected from the floodplain. Typical installation consists of installing a "Vee" shaped rock structures with points facing upstream for the purpose of raising the water surface profile. Cost estimate is for three check dams with a top width of 3', max height of 6', min height of 3', and 28' length; containing an average of 58 cubic yards or 29 tons of rock for a total of 87 tons. The check dams are underlain with geotextile fabric. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as water quality degradation and soil erosion-concentrated flow erosion.

**Before Situation:**

The stream presently is incised with near vertical banks caused by bank toe erosion and sloughing. This condition has caused the floodplains to be disconnected from the stream, with only floods well above normal high-water escaping the high banks of the stream.

**After Situation:**

Banks are stabilized, and pools are created raising the Water Surface Profile elevation and effectively reducing the slope. Riffle pool scheme is restored and banks are protected. Water quality is protected downstream due to erosion protection, and wetland features are restored in the floodplain. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Streambank and Shoreline Protection (580), Channel Bed Stabilization (584), Stream Habitat Improvement and Management (395), and Wetland Wildlife Habitat Management (644) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Tons of rock installed

**Scenario Unit::** Ton

**Scenario Typical Size:** 87.0

**Scenario Total Cost:** $16,440.05

**Scenario Cost/Unit:** $188.97

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 32 | $6,836.80 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 32 | $3,615.04 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 87 | $5,988.21 |

**Practice:** 587 - Structure for Water Control

**Scenario** #13 - CMP Turnout

**Scenario Description:**

A corrugated metal pipe (CMP) equipped with a slide gate diverts water from a ditch or canal into a field or field ditch. This scenario is for a 15 inch diameter gate and pipe that will transmit approximately 4 cfs of flow.

**Before Situation:**

A ditch or canal exists, but a means to move water from the ditch into a smaller ditch or field does not exist. A water supply of sufficient quantity and quality is available for irrigation.

**After Situation:**

Water is diverted from a canal or ditch to meet irrigation requirements. A 15 inch diameter CMP is installed through the canal containment dike,. A 15 inch diameter slide gate is attached to the upstream end of the pipe. The top of the pipe inlet is below canal water surface elevation.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $812.15

**Scenario Cost/Unit:** $812.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 1 | $55.03 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1 | $27.12 |
| **Materials** | | | | | | |
| Pipe, CMP, 12", 16 Gauge | 1269 | 12" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only. | Foot | $10.99 | 10 | $109.90 |
| Slide gate, steel, 1' diameter, low head | 1830 | 1' diameter steel slide gate for low head installations | Each | $121.52 | 1 | $121.52 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 587 - Structure for Water Control

**Scenario** #14 - Concrete Turnout Structure, Small

**Scenario Description:**

A reinforced concrete turnout structure equipped with slide boards or panels diverts irrigation water from a ditch or canal into a field or field ditch. This scenario is for a four ft tall, two foot wide, and five foot long turnout structure.

**Before Situation:**

A ditch or canal exists, but a means to move water from the ditch into a smaller ditch or field does not exist. A water supply of sufficient quantity and quality is available for irrigation.

**After Situation:**

Water is diverted from a canal or ditch to meet irrigation requirements. A two foot wide and four foot tall turnout structure equipped with slots for slide boards and panels conducts water through the canal berm into a field. The concrete structure is five feet long and has an end sill. All footings, floors. and walls have a minimum thickness of six inches. The structure delivers water to field elevation or ditch bottom elevation. The top of the pipe inlet is below canal water surface elevation.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,536.86

**Scenario Cost/Unit:** $1,536.86

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 2 | $873.98 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 2 | $110.06 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 2 | $54.24 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 587 - Structure for Water Control

**Scenario** #15 - Concrete Turnout Structure, Large

**Scenario Description:**

A reinforced concrete turnout structure equipped with a 48 inch slide gate diverts irrigation water from a canal into a field or field ditch. This scenario is for a six ft tall, eight foot wide, and ten foot long turnout structure. A sloping trash rack fabricated from rebar is installed on the inlet. If needed fish screens may be installed at the inlet..

**Before Situation:**

A delivery canal exists, but a means to move water from the canal into a smaller ditch or field does not exist. A water supply of sufficient quantity and quality is available for irrigation.

**After Situation:**

Water is diverted from a canal to meet irrigation requirements. A eight foot wide and six foot tall turnout structure equipped with a 48 inch slide gate conducts water through the canal berm. The concrete structure is ten feet long and has an end sill. All footings, floors. and walls have a minimum thickness of six inches. The structure delivers water to field or ditch bottom elevation.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,549.82

**Scenario Cost/Unit:** $3,549.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 4 | $1,747.96 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| **Materials** | | | | | | |
| Welded Bar Grate, metal | 1980 | Heavy duty vertical bar welded grating, typically 1-1/4"x 3/16" bars on 1" spacing with cross rod on 4" spacing. Materials only. | Square Foot | $13.46 | 48 | $646.08 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 587 - Structure for Water Control

**Scenario** #16 - Reinforced Concrete Structure

**Scenario Description:**

A reinforced concrete structure to control the intake and delivery of water. This scenario is for a six ft tall, eight foot wide, and ten foot long structure. If needed fish screens may be installed at the inlet

**Before Situation:**

A water delivery mechanism exists, but a means to move water from the intake into a smaller ditch, field or pipeline does not exist. A water supply of sufficient quantity and quality is available.

**After Situation:**

Water is diverted from a canal to meet irrigation requirements. A eight foot wide and six foot tall turnout structure equipped with a slide gate or valve conducts water through the canal berm to the water delivery intake.

**Feature Measure:** Cubic Yard

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,928.40

**Scenario Cost/Unit:** $592.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 10 | $4,369.90 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 2 | $56.22 |
| Screw gate, cast iron, 1' diameter, 10/0 head | 1861 | 1' diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only. | Each | $751.14 | 2 | $1,502.28 |

**Practice:** 587 - Structure for Water Control

**Scenario** #17 - Flow Meter with Mechanical Index

**Scenario Description:**

Permanently installed water flow meter with mechanical, cumulative volume and rate index. Meters can be any flow measurement device that meets CPS 433, (i.e. meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 441-Irrigation System, Microirrigation, 443-Irrigation System Surface and Subsurface, 442-Irrigation System, Sprinkler, 328-Conservation Crop Rotation, 634-Waste Transfer, and 590-Nutrient Management.

**Before Situation:**

Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.

**After Situation:**

Producer is able to access instantaneous rate and cumulative flow volume data at the meter location. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.

**Feature Measure:** Nominal Diameter of Meter

**Scenario Unit::** Inch

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,902.24

**Scenario Cost/Unit:** $190.22

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Flow Meter, with mechanical Index | 1450 | 10 inch, Turbine Type Flow Meter with Mechanical Index, permanently installed. Includes material, labor and installation. | Each | $1,902.24 | 1 | $1,902.24 |

**Practice:** 587 - Structure for Water Control

**Scenario** #18 - Flow Meter with Electronic Index

**Scenario Description:**

Permanently installed water flow meter with an electronic index . Meters can be any flow measurement device that meets CPS 433, (i.e., meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes or data logging capability. Meter nominal diameter for insert type turbine meters will be installation pipe size. Typical installation would include installation of a 10 inch turbine flow meter, with electronic index output. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 441-Irrigation System, Microirrigation, 443-Irrigation System Surface and Subsurface, 442-Irrigation System, Sprinkler, 328-Conservation Crop Rotation, 634-Waster Transfer, and 590-Nutrient Management.

**Before Situation:**

Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.

**After Situation:**

Producer is able to access instantaneous rate and cumulative flow volume data at the meter location. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.

**Feature Measure:** Nominal Diameter of Meter

**Scenario Unit::** Inch

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,747.37

**Scenario Cost/Unit:** $374.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,747.37 | 1 | $3,747.37 |

**Practice:** 587 - Structure for Water Control

**Scenario** #19 - Flow Meter with Electronic Index & Telemetry

**Scenario Description:**

Permanently installed water flow meter with an electronic flow rate and volume index and data telemetry transmission system. Meters can be any flow measurement device that meets CPS 433, (i.e. meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes. Meter nominal diameter for insert type turbine meters will be installation pipe size. Typical installation would include installation of a 10 inch magnetic flow meter, with electronic index output and telemetry data transfer system for monitoring irrigation system flow rate. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 441-Irrigation System, Microirrigation, 443-Irrigation System Surface and Subsurface, 442-Irrigation System, Sprinkler, 328-Conservation Crop Rotation, 634-Waste Transfer, and 590-Nutrient Management.

**Before Situation:**

Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.

**After Situation:**

Producer is able to access instantaneous rate and cumulative flow volume data from a personal computer or cell phone at any time. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.

**Feature Measure:** Nominal Diameter of Meter

**Scenario Unit::** Inch

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,260.74

**Scenario Cost/Unit:** $526.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Flow Meter, with electronic Index and telemetry | 1451 | 10 inch Magnetic Irrigation Flow Meter, with electronic index and equipped for telemetry, permanently installed. Includes material, meter appurtenances, and installation. | Each | $5,260.74 | 1 | $5,260.74 |

**Practice:** 587 - Structure for Water Control

**Scenario** #20 - Paddlewheel Screen

**Scenario Description:**

A fish screen used at surface (gravity) diversions intended to prevent juvenile or small-bodied adult fish from entering ditches, canals, laterals or other pathways that lead to migration dead-ends or sources of mortality. Paddlewheel screens are active by design, meaning that they are outfitted with mechanisms that automatically cycle to keep the screen free of debris that will restrict the screen area, impede flow through the screen, and may cause the screen to fail. These screens are powered by a paddlewheel driven by flowing water and are thus suitable for remote locations without electrical services. Paddlewheel screens can be installed in the active channel along a streambank, but are most commonly built in a canal below a diversion structure. Aquatic organisms that encounter a screen installed in a canal are diverted back into the adjacent stream through a buried pipe. Screens installed in the active channel are built at the point of diversion with the screen face aligned parallel to the flow of the river. Bankline modifications can be necessary to achieve proper alignment. Screens installed in a canal can be aligned differently and are best sited at a canal location that minimizes the straight-line bypass/return path distance. Again, canal installation is the most common. A fully functional screen is designed to meet criteria intended to protect target organisms from being swept into and pinned against or along the screen face (impingement). When this occurs, animals can be physically harmed or, in the case of a rotating drum screen, introduced into the diversion works behind the screen. Active screens are designed to ensure that the approach velocity will not exceed .4 feet per second (fps). Approach velocity is calculating by dividing the maximum screened flow volume by the vertical projection of the effective screen area at maximum submergence. For a rotating drum screen the design submergence should not be more than 85% or less than 65% of the screen diameter. Screen design should strive to provide nearly uniform flow distribution across the screen surface. Screens longer than 6 feet must be angled to the direction of incoming flow and have sweeping velocities (along the face of the screen) greater than the approach velocity, and sweeping velocities should not decrease along the face of the screen. Screen face openings must not exceed 3/32 inch in diameter, and perforated plate must be smooth to the touch with openings punched through in the direction of approaching flow. Material used for the screen face should be corrosion resistant and sufficiently durable to maintain a smooth uniform surface with long term use. Bypass design flow should be about 5% of the diverted amount, include an easily accessible entrance, and flow velocity in the bypass pipe or channel should not exceed 0.2fps. Minimum design depth in a bypass pipe should be at least 40% of the pipe diameter. Bypass entrances should be installed with independent flow control capability. The face of all screen surfaces must be placed flush (to the extent possible) with any adjacent screen bay, pier noses, and walls to allow fish unimpeded movement parallel to the screen face and ready access to bypass routes. Paddlewheel screens are generally fabricated at a machine shop and delivered to the project site. Site conditions may require the construction of a small concrete headwall that will anchor the screen and may be outfitted with flow control that to adjust hydraulic conditions and optimize screen function. In addition, concrete training walls to conduct flow into, through, and below the screen may be required at some sites. Paddlewheel screens are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. A crane or boom truck may be needed to place the screen assembly. Other actions include construction staking and signage, soil erosion and pollution control, access control and fencing, and topsoil conservation for site reclamation. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed to address channel incision, bank stability, or factors associated with channel improvements at the bypass pipe outfall. Final contracts stipulate entities and schedules for operation and maintenance. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

**Before Situation:**

An unscreened gravity diversion removes water and fish from a small stream. The ditch under the 5 cfs diversion serves a number of pumps and turnouts used to irrigate alfalfa and flood irrigate hay. The diversion is run from late winter into fall, although the flood irrigated crops are shut off in mid-summer to allow growth and prepare the fields for mowing and haying. Although the diversion is owned by a nth-generation landowner with proven, long-standing rights to the diverted water, recent fish listings under the Endangered Species Act present liability risks in the face of a third party lawsuit. Diverted listed fish are killed in residual depressions in the irrigated meadow, and often become entrained and killed in pumps used to drive wheel lines used to irrigate alfalfa.

**After Situation:**

A modular rotating drum paddlewheel screen is installed in the ditch about 100 feet downstream of the diversion dam. The screen is outfitted with a screw-gated 10-inch smooth HDPE pipe buried below the floodplain that connects the bypass entrance to a deep pool in the adjacent stream. The screen is placed on an excavated bed backfilled with compacted sand and gravel, and bolted to a small reinforced poured-in-place concrete headwall. Inspection during the first operational season following construction confirms that the screen is within hydraulic criteria and providing adequate protection to listed fish. The screen structure is fenced from livestock, and inspected and maintained according to contractual agreements. Resource Concerns are addressed within the context of the site.

**Feature Measure:** CFS

**Scenario Unit::** Cubic Foot per Second

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $68,118.49

**Scenario Cost/Unit:** $13,623.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 15 | $6,554.85 |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $307.21 | 1 | $307.21 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 40 | $6,457.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 40 | $1,751.20 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 25 | $5,341.25 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equipment and operator. | Hour | $133.12 | 32 | $4,259.84 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 32 | $3,038.40 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 70 | $2,734.20 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 70 | $1,988.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 40 | $1,084.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 50 | $2,362.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 200 | $22,594.00 |
| **Materials** | | | | | | |
| Irrigation, Filtration Unit | 329 | Filtration Unit | Gallon per Minute | $3.37 | 2244 | $7,562.28 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 587 - Structure for Water Control

**Scenario** #21 - Rotating Drum Screen

**Scenario Description:**

A fish screen used at surface (gravity) diversions intended to prevent juvenile or small-bodied adult fish from entering ditches, canals, laterals or other pathways that lead to migration dead-ends or sources of mortality. Rotating drum screens are active by design, meaning that they are outfitted with mechanisms that automatically cycle to keep the screen free of debris that will restrict the screen area, impede flow through the screen, and may cause the screen to fail. These screens are powered electric motors that rotate a drum covered in fine stainless steel mesh. The drum rotates in the direction of the incoming flow, and is designed to protect fish from entrainment into the diversion while at the same time rolling fine debris attached to the screen face into the ditch or canal below. Rotating drum screens can be installed in the active channel along a streambank, but are most commonly built in a canal below a diversion structure. . Aquatic organisms that encounter a screen installed in a canal are diverted back into the adjacent stream through a buried pipe. Screens installed in the active channel are built at the point of diversion with the screen face aligned parallel to the flow of the river. Bankline modifications can be necessary to achieve proper alignment. Screens installed in a canal can be aligned differently and are best sited at a canal location that minimizes the straight-line bypass/return path distance. Again, canal installation is the most common. A fully functional screen is designed to meet criteria intended to protect target organisms from being swept into and pinned against or along the screen face (impingement). When this occurs, animals can be physically harmed or, in the case of a rotating drum screen, introduced into the diversion works behind the screen. Active screens are designed to ensure that the approach velocity will not exceed .4 feet per second (fps). Approach velocity is calculating by dividing the maximum screened flow volume by the vertical projection of the effective screen area at maximum submergence. For a rotating drum screen the design submergence should not be more than 85% or less than 65% of the screen diameter. Screen design should strive to provide nearly uniform flow distribution across the screen surface. Screens longer than 6 feet must be angled to the direction of incoming flow and have sweeping velocities (along the face of the screen) greater than the approach velocity, and sweeping velocities should not decrease along the face of the screen. Screen face openings must not exceed 3/32 inch in diameter, and perforated plate must be smooth to the touch with openings punched through in the direction of approaching flow. Material used for the screen face should be corrosion resistant and sufficiently durable to maintain a smooth uniform surface with long term use. Bypass design flow should be about 5% of the diverted amount, include an easily accessible entrance, and flow velocity in the bypass pipe or channel should not exceed 0.2fps. Minimum design depth in a bypass pipe should be at least 40% of the pipe diameter. Bypass entrances should be installed with independent flow control capability. The face of all screen surfaces must be placed flush (to the extent possible) with any adjacent screen bay, pier noses, and walls to allow fish unimpeded movement parallel to the screen face and ready access to bypass routes. Rotating drum screens are composed of elements fabricated at a machine shop and delivered to the project site, or built onsite. They are generally part of a reinforced, poured-in-place mass of concrete that forms a three-sided section above, around, and below the screen. Onsite derricks or metal framework can be required above screen bays to facilitate lifting drums for maintenance and inspection of side and bottom seals. Rotating drum screens may need to be fitted with flow control devices that to adjust hydraulic conditions and optimize screen function. Rotating drum screens are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. A crane or boom truck may be needed to place elements of larger screen installations, including gates, drums, and overhead metal framework. Other actions include construction staking and signage, soil erosion and pollution control, access control and fencing, and topsoil conservation for site reclamation. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed to address channel incision, bank stability, or factors associated with channel improvements at the bypass pipe outfall. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

**Before Situation:**

An unscreened gravity diversion removes water and fish from a medium-sized stream. The ditch under the 75 cfs diversion serves a number of pumps and turnouts used to irrigate alfalfa and flood irrigate hay. The diversion is run from late winter into fall, although the flood irrigated crops are shut off in mid-summer to allow growth and prepare the fields for mowing and haying. Although the diversion is owned by a nth-generation landowner with proven, long-standing rights to the diverted water, recent fish listings under the Endangered Species Act present liability risks in the face of a third party lawsuit. Diverted listed fish are killed in residual depressions in the irrigated meadow, and often become entrained and killed in pumps used to drive wheel lines used to irrigate alfalfa.

**After Situation:**

A rotating drum screen consisting of three 8-foot wide, 4-foot diameter drums each driven by a 5hp electric motor is installed in the ditch about 200 feet downstream of the diversion dam. The screen is outfitted with a screw-gated 20-inch smooth HDPE pipe buried below the floodplain that connects the bypass entrance to a deep pool in the adjacent stream. The screen is placed in a concrete section extending above, underneath and below the drum location that forms the structure holding the drums, side and bottom seals, bypass entrance, and screen fore and afterbay. A steel I-beam structure is erected to form continuous overhead cover above the screen bays, and outfitted with a traveling electric winch used to raise each drum for periodic maintenance and seal inspection. Inspection during the first operational season following construction confirms that the screen is within hydraulic criteria and providing adequate protection to listed fish. The screen structure is fenced from livestock, and inspected and maintained according to contractual agreements. Resource Concerns are addressed within the context of the site.

**Feature Measure:** CFS

**Scenario Unit::** Cubic Foot per Second

**Scenario Typical Size:** 75.0

**Scenario Total Cost:** $211,230.88

**Scenario Cost/Unit:** $2,816.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 100 | $43,699.00 |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $307.21 | 1 | $307.21 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 50 | $288.50 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 40 | $6,457.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 40 | $1,751.20 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 25 | $5,341.25 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equipment and operator. | Hour | $133.12 | 32 | $4,259.84 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 32 | $3,038.40 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 67 | $2,617.02 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 67 | $1,902.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 40 | $1,084.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 200 | $22,594.00 |
| **Materials** | | | | | | |
| Irrigation, Filtration Unit | 329 | Filtration Unit | Gallon per Minute | $3.37 | 33662 | $113,440.94 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 587 - Structure for Water Control

**Scenario** #22 - Fish screen, irrigation type, <1 cfs

**Scenario Description:**

A <1cfs fish screen used to keep fish out of irrigation intake pipelines. Associated practices may include: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, (395) Stream Habitat Improvement and Management, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (430) Irrigation Pipeline

**Before Situation:**

An unscreened pipeline removes water and fish from a small stream.

**After Situation:**

A fish screen is in place and keeps fish from entering the pipeline intake. The screen structure is fenced from livestock, and inspected and maintained according to contractual agreements. Resource Concerns are addressed within the context of the site.

**Feature Measure:** CFS

**Scenario Unit::** Cubic Foot per Second

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $1,361.54

**Scenario Cost/Unit:** #Div/0!

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Irrigation, Filtration Unit | 329 | Filtration Unit | Gallon per Minute | $3.37 | 336.6 | $1,134.34 |

**Practice:** 587 - Structure for Water Control

**Scenario** #23 - Fish screen, irrigation type, 1-3 cfs

**Scenario Description:**

A 1-3 cfs fish screen used to keep fish out of irrigation intake pipelines. Associated practices may include: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, (395) Stream Habitat Improvement and Management, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (430) Irrigation Pipeline

**Before Situation:**

An unscreened pipeline removes water and fish from a small stream.

**After Situation:**

A fish screen is in place and keeps fish from entering the pipeline intake. The screen structure is fenced from livestock, and inspected and maintained according to contractual agreements. Resource Concerns are addressed within the context of the site.

**Feature Measure:** CFS

**Scenario Unit::** Cubic Foot per Second

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,495.21

**Scenario Cost/Unit:** $2,495.21

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Irrigation, Filtration Unit | 329 | Filtration Unit | Gallon per Minute | $3.37 | 673 | $2,268.01 |

**Practice:** 587 - Structure for Water Control

**Scenario** #24 - Fish screen, irrigation type, 3-6 cfs

**Scenario Description:**

A 3-6 cfs fish screen used to keep fish out of irrigation intake pipelines. Associated practices may include: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, (395) Stream Habitat Improvement and Management, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (430) Irrigation Pipeline

**Before Situation:**

An unscreened pipeline removes water and fish from a small stream.

**After Situation:**

A fish screen is in place and keeps fish from entering the pipeline intake. The screen structure is fenced from livestock, and inspected and maintained according to contractual agreements. Resource Concerns are addressed within the context of the site.

**Feature Measure:** CFS

**Scenario Unit::** Cubic Foot per Second

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $7,034.60

**Scenario Cost/Unit:** $1,758.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Irrigation, Filtration Unit | 329 | Filtration Unit | Gallon per Minute | $3.37 | 2020 | $6,807.40 |

**Practice:** 587 - Structure for Water Control

**Scenario** #25 - Fish screen, irrigation type, >6 cfs

**Scenario Description:**

A >6 cfs fish screen used to keep fish out of irrigation intake pipelines. Associated practices may include: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, (395) Stream Habitat Improvement and Management, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (430) Irrigation Pipeline

**Before Situation:**

An unscreened pipeline removes water and fish from a small stream.

**After Situation:**

A fish screen is in place and keeps fish from entering the pipeline intake. The screen structure is fenced from livestock, and inspected and maintained according to contractual agreements. Resource Concerns are addressed within the context of the site.

**Feature Measure:** CFS

**Scenario Unit::** Cubic Foot per Second

**Scenario Typical Size:** 8.0

**Scenario Total Cost:** $12,328.87

**Scenario Cost/Unit:** $1,541.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Irrigation, Filtration Unit | 329 | Filtration Unit | Gallon per Minute | $3.37 | 3591 | $12,101.67 |

**Practice:** 587 - Structure for Water Control

**Scenario** #26 - Fish screen, Horizontal Flat Plate

**Scenario Description:**

Installation of a horizontal flat plate fish screen. Horizontal flat plate fish screens allow an irrigator to withdraw water from a river or stream without taking fish or debris into their irrigation system. While active screens use mechanical cleaning mechanisms to keep the screen surface free of debris, passive horizontal flat plate fish screens use hydraulics (the movement of water) to keep the screen surface clean. Horizontal flat plate fish screens are typically installed in off-stream locations, behind a functioning head gate that can regulate flow. This type of screen requires by-pass flow to operate. The by-pass flow is what flows off the end of the fish screen and returns fish and debris to the source river or stream. Horizontal flat plate fish screens also require some head (or elevation differential) to operate. This type of fish screen is only appropriate where there is adequate flow to allow by-pass flow at all times and sufficient head available. Horizontal flat plate fish screens can come in different formats. For smaller diversions (1 to 16 CFS), pre-fabricated steel units can be utilized to reduce installation costs. For larger diversions, a concrete structure is typically constructed. A power source is not necessary for a horizontal flat plate fish screen. Associated practices may include: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, (395) Stream Habitat Improvement and Management, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (430) Irrigation Pipeline

**Before Situation:**

An unscreened pipeline removes water and fish from a small stream.

**After Situation:**

A fish screen is in place and keeps fish from entering the pipeline intake. The screen structure is fenced from livestock, and inspected and maintained according to contractual agreements. Resource Concerns are addressed within the context of the site. Typical scenario is for an 8 cfs screen

**Feature Measure:** CFS

**Scenario Unit::** Cubic Foot per Second

**Scenario Typical Size:** 8.0

**Scenario Total Cost:** $42,729.54

**Scenario Cost/Unit:** $5,341.19

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 40 | $6,457.60 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 40 | $8,546.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 55 | $1,562.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 80 | $9,037.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 15 | $427.35 |
| Irrigation, Filtration Unit | 329 | Filtration Unit | Gallon per Minute | $3.37 | 3591 | $12,101.67 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 587 - Structure for Water Control

**Scenario** #275 - Forest road cross drain, HDPE <= 30 inches diameter

**Scenario Description:**

Install a new HDPE culvert under 30 inches in diameter to convey water under forest roads. A typical scenario would be an 24 inch diameter pipe, 40 feet in length. Work includes site preparation, acquiring and installing culvert pipe and fill (compacted), and riprap protection of side slopes. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic. Use (578) Stream Crossing for culverts = 30 inches or perennial flow.

**Before Situation:**

Water flow needs to be conveyed under an access road, ditch or other barrier. Water must be conveyed in a controlled fashion.

**After Situation:**

Water is conveyed in a controlled manner. Associated practices could be Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).

**Feature Measure:** Pipe diameter (pipe diameter - inc

**Scenario Unit::** Diameter Inch Foot

**Scenario Typical Size:** 960.0

**Scenario Total Cost:** $1,797.48

**Scenario Cost/Unit:** $1.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 5 | $11.55 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 20 | $115.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 14 | $397.60 |
| **Materials** | | | | | | |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 24" | 1246 | Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $23.87 | 40 | $954.80 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 587 - Structure for Water Control

**Scenario** #287 - Recycled Water Connection

**Scenario Description:**

Work under this scenario allows a farm to access a nearby water line that has recycled municipal water that has been treated and has the appropriate quality for irrigation use. Access to the recycled water improves soil moisture management and offsets the effects of changing climate conditions or excessive dry conditions experienced during a drought. Water control valve(s) and associated plumbing are installed by the farm which allows water to be diverted from the recycled water line to the farm's irrigation system, for use as irrigation water. The recycled water provides supplemental water to the farm's existing irrigation water source to improve irrigation management leading to proper soil moisture levels that maintain appropriate plant health and production. Components meet state and local health and safety requirements for connecting with municipal water systems. This scenario addresses the resource concern of Insufficient Water-Inefficient moisture management. Associated practices include: 430-Pipeline; 449-Irrigation Water Management.

**Before Situation:**

Changing climates and dry conditions due to drought affects irrigation water availability, and application timing does not always allow for appropriate levels of soil moisture for plant health and production. Plants are stressed at times due to poor timing of irrigation water availability creating poor plant health.

**After Situation:**

A connection is made to a recycled water line which diverts water into an irrigation system. Recycled water is used to improve the timing of irrigation water application. As a result, soil moisture levels are better managed leading to improved plant health and production.

**Feature Measure:** A Connection to Water Line

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,844.04

**Scenario Cost/Unit:** $5,844.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 16 | $880.48 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 64 | $2,499.84 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| **Materials** | | | | | | |
| Pipe, Steel, 6", SCH 40 | 1006 | Materials: - 6" - Steel SCH 40 | Foot | $36.80 | 20 | $736.00 |
| Water Level Control Valve, Inline | 2189 | Automatic float valve for drainage pipes up to 8"dia. To maintain head differential in flowing agricultural drains. | Each | $646.90 | 2 | $1,293.80 |

**Practice:** 587 - Structure for Water Control

**Scenario** #298 - Slide gate

**Scenario Description:**

This scenario is the installation of a permanent slide gate structure (only) to control the conveyance of water. The typical size is a one foot diameter opening. The slide gate may be installed on an open channel or pipeline. The slide gate is made of steel and is operated manually. This scenario assists in addressing the resource concerns: water management. Conservation practices that may be associated are: 533-Pumping Plant.

**Before Situation:**

A channel or pipeline is in need of a head gate to control the flow of water.

**After Situation:**

A one foot diameter slide gate, manually operated, is installed.

**Feature Measure:** diameter

**Scenario Unit::** Foot

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $883.04

**Scenario Cost/Unit:** $883.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| **Materials** | | | | | | |
| Slide gate, steel, 1' diameter, low head | 1830 | 1' diameter steel slide gate for low head installations | Each | $121.52 | 1 | $121.52 |

**Practice:** 589C - Cross Wind Trap Strips

**Scenario** #5 - Cross Wind Trap Strips, Native Perennials

**Scenario Description:**

This scenario describes the implementation of cross wind trap strips with native perennial grasses and/or legumes for one or more of the following purposes: 1) to reduce soil erosion by wind, 2) reduce wind-borne sediment deposition, 3) induce snow deposition to improve soil moisture, 4) protect sensitive crops from wind-borne soil particulate damage, and 5) improve air quality by reducing airborne particulate matter. In this resource setting, cropland fields are unprotected against the erosive forces of wind that cause soil loss, damage to crop seedlings, sediment deposition and/or poor air quality. The scenario is based on the acres of strips established.

**Before Situation:**

Typically, cropland fields 80 acres in size and larger, have excessive soil disturbance and unsheltered distances that result in excessive wind erosion that damage soil quality as well as reduce air quality. Depending on the time of year, soil condition, and stage of crop growth, wind velocities may cause sandblasting or covering up of newly planted seedlings, increase off-site damage due to soil deposition, or reduce air quality by the generation of airborne particulate matter. The cropping system coupled with intensive tillage provide an environment where wind erosion occurs at rates over tolerable soil and/or sensitive crop limits as outlined in the National Agronomy Manual. Typically the strips occupy about 7-10% of the area.

**After Situation:**

Implementation Requirements will be prepared for the site and implemented according the Cross Wind Trap Strips (589C) standard. Appropriate orientation and width of trap strips will be determined using current WEPS (Wind Erosion Prediction System) technology. The planned trap strip system will meet appropriate criteria for the resource concern (i.e. stand erect during the design critical period, be placed upwind for snow accumulation or protection of sensitive crops, meet the minimum height criteria, etc.). For this scenario, the strips will consist of native perennial species, generally placed across an entire field. Implementation will reduce soil loss to a tolerable level. The scenario includes costs associated with the establishment of the trap strips.

**Feature Measure:** Acres of trap strips

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $195.99

**Scenario Cost/Unit:** $195.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Site Preparation, Mechanical | 944 | Aerator, rolling drum chopper, etc. Includes equipment, power unit and labor costs. | Acre | $61.14 | 1 | $61.14 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1.6 | $45.44 |
| **Materials** | | | | | | |
| Untreated Conventional Seed, One Species, Warm Season, Native Perennial Grass | 2341 | Untreated conventional native, warm season perennial grass. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $68.44 | 1 | $68.44 |

**Practice:** 589C - Cross Wind Trap Strips

**Scenario** #6 - Cross Wind Trap Strips, Introduced Perennials

**Scenario Description:**

This scenario describes the implementation of cross wind trap strips with introduced perennial grasses and/or legumes for one or more of the following purposes: 1) to reduce soil erosion by wind, 2) reduce wind-borne sediment deposition, 3) induce snow deposition to improve soil moisture, 4) protect sensitive crops from wind-borne soil particulate damage, and 5) improve air quality by reducing airborne particulate matter. In this resource setting, cropland fields are unprotected against the erosive forces of wind that cause soil loss, damage to crop seedlings, sediment deposition and/or poor air quality. The scenario is based on the acres of strips established.

**Before Situation:**

Typically, cropland fields 80 acres in size and larger, have excessive soil disturbance and unsheltered distances that result in excessive wind erosion that damage soil quality as well as reduce air quality. Depending on the time of year, soil condition, and stage of crop growth, wind velocities may cause sandblasting or covering up of newly planted seedlings, increase off-site damage due to soil deposition, or reduce air quality by the generation of airborne particulate matter. The cropping system coupled with intensive tillage provide an environment where wind erosion occurs at rates over tolerable soil and/or sensitive crop limits as outlined in the National Agronomy Manual. Typically the strips occupy about 7-10 % of the area.

**After Situation:**

Implementation Requirements will be prepared for the site and implemented according the Cross Wind Trap Strips (589C) standard. Appropriate orientation and width of trap strips will be determined using current WEPS (wind erosion prediction system) technology. The planned trap strip system will meet appropriate criteria for the resource concern (i.e. stand erect during the design critical period, be placed upwind for snow accumulation or protection of sensitive crops, meet the minimum height criteria, etc.). For this scenario, the strips will consist of introduced perennial species, generally placed across an entire field. Implementation will reduce soil loss to a tolerable level. The scenario includes costs associated with the establishment of the trap strips.

**Feature Measure:** Acres of trap strips

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $210.56

**Scenario Cost/Unit:** $210.56

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Site Preparation, Mechanical | 944 | Aerator, rolling drum chopper, etc. Includes equipment, power unit and labor costs. | Acre | $61.14 | 1 | $61.14 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1.2 | $34.08 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.48 | 60 | $28.80 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 40 | $18.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 40 | $16.00 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.57 | 1 | $31.57 |

**Practice:** 590 - Nutrient Management

**Scenario** #1 - Basic NM (Non-Organic/Organic)

**Scenario Description:**

This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where there is no manure application. Scenario is applicable on non-organic and organic land. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement, and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, analysis, and implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required.

**Before Situation:**

In this geographic area, a fertility program is either nonexistent or does not meet the Nutrient Management (590) CPS. Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, or soil erosion, or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.

**After Situation:**

A nutrient management system will be developed to meet the current Nutrient Management (590) CPS, when applicable system will also meet NOP regulations. Development and implementation of a nutrient management plan (NMP) will benefit plant productivity while also reducing potential for off-site degradation. A nutrient management budget will be developed for each field(s) based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing is completed according to LGU recommendations. Records will be provided annually of the current soil test, analysis, application rates, forms and rates of nutrients for each field, including crop yields. Nutrient applications will be completed according to the Nutrient Management Plan that minimizes nutrient runoff and leaching or buildup of excess nutrient concentrations.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $381.35

**Scenario Cost/Unit:** $9.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 2 | $20.42 |

**Practice:** 590 - Nutrient Management

**Scenario** #2 - Basic NM with Manure Injection or Incorporation

**Scenario Description:**

This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where all applied nutrient sources (nitrogen, phosphorus, and potassium) are either incorporated using tillage at least 3-4 inches deep or injected into the soil at least 3-6 inches deep (Exceptions for incorporation or injection include: established close grown crops such as wheat or perennial crops such as hay or pasture). This scenario is applicable on non-organic and organic land for all nutrient sources (manure, compost, commercial fertilizers, and organic sources of nutrients). Micro-nutrients may be surface applied. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement (incorporation or injection), and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, manure analysis, incorporation or injection of all nutrients, and the implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required. Scenario is designed to address the Nutrient Management (590) purposes for nitrogen losses via N2O emissions, nitrogen leaching, and nitrogen and phosphorus surface runoff. The basis for nutrient applications will be recommendations based on soil tests; and when applicable, plant tissue, manure, and compost analyses. Soil loss is controlled to the soil loss tolerance criteria or less for the significant soil map unit.

**Before Situation:**

In this geographic area, a fertility program is not properly managed to supply the proper rate, timing, method of application, and source to address air and water quality. Application of fertilizers, including manures, composts, and amendments, are surface applied and completed annually based upon tradition that does not specifically consider the detrimental effects of improper timing or rates of all nutrient sources, or excess nutrient buildup in the soil, emissions of N2O, surface runoff, or the leaching of nitrogen to ground or surface water via subsurface drainage. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Soil testing is not completed on a regular basis and applications of all nutrient sources are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, soil erosion, or to ground water from leaching in quantities that degrade air and water quality. Soil quality may be degraded by excess or inadequate nutrients and erosion. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion in excess of the planning criteria.

**After Situation:**

A nutrient management system is developed with the producer to meet the current Nutrient Management (590) CPS; and when applicable, the system will also meet NOP regulations. All nutrient sources will be incorporated with tillage at least 3-4 inches deep or injected at least 4-6 inches deep into the soil (Exceptions for incorporation or injection include: established close grown crops such as wheat or perennial crops such as hay or pasture). Implementation of the nutrient management plan (NMP) will benefit plant productivity while also reducing the potential for off-site degradation. A nutrient management budget will be developed for each field based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing (and where applicable manure analyses, plant tissue analyses, etc.) is completed according to LGU recommendations. Applications of all phosphorus and nitrogen sources are based on risk assessments (PI - phosphorus index and leaching index). Records will be provided annually documenting current soil tests and other plant or manure analyses, date and rate of applications, form and placement of nutrients for each field, including post-harvest yields. Nutrient applications will be completed according to the NMP that minimizes nutrient runoff, nitrogen leaching, nitrogen emissions, or buildup of excess nutrient concentrations in the soil.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $1,468.43

**Scenario Cost/Unit:** $36.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 40 | $652.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 2 | $20.42 |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $45.54 | 1 | $45.54 |
| Test, Compost Analysis | 307 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $50.00 | 1 | $50.00 |

**Practice:** 590 - Nutrient Management

**Scenario** #3 - Small Farm NM (Non-Organic/Organic)

**Scenario Description:**

Scenario is applicable on non-organic and organic land. Scenario implementation of a basic nutrient management system on small, often diversified farm systems typically between 0.5-10 acres where manure and/or compost may be utilized either alone or in conjunction with commercial fertilizer. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement, and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, manure and/or compost analysis, and implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required. Scenario is designed to encourage producers to effectively utilize commercial fertilizers, organic fertilizers, manure, and/or compost appropriately improving soil quality and minimizing runoff of nutrients from fields to surface waters. The basis for nutrient applications will be recommendations based on soil, manure, and compost analyses.

**Before Situation:**

In this geographic area, a fertility program is either nonexistent or does not meet the Nutrient Management (590). Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, or soil erosion, or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.

**After Situation:**

A nutrient management system will be developed to meet the current Nutrient Management (590), when applicable system will also meet NOP regulations. Development and implementation of a nutrient management plan (NMP) will benefit plant productivity while also reducing potential for off-site degradation. A nutrient management budget will be developed for each field, crop block, or crop rotation within a block/field based on soil test analysis and land grant university recommendations or crop removal rates. Application of nutrients will be completed at the proper rate, timing, and methods, and sources per the NMP. Records will be provided annually of current soil test, analysis, application timing, nutrient source, application method, application rate, and crop yields for each block. Nutrient applications will be completed according to the NMP that minimizes nutrient runoff and leaching or buildup of excess nutrient concentrations.

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $314.13

**Scenario Cost/Unit:** $314.13

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 3 | $85.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 1 | $112.97 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 2 | $20.42 |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $45.54 | 1 | $45.54 |
| Test, Compost Analysis | 307 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $50.00 | 1 | $50.00 |

**Practice:** 590 - Nutrient Management

**Scenario** #4 - Basic NM with Manure and/or Compost (Non-Organic/Organic)

**Scenario Description:**

This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where manure and/or compost is utilized either alone or in conjunction with commercial fertilizer. Scenario is applicable on non-organic and organic land. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement, and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, manure and/or compost analysis, and implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required. Scenario is designed to encourage producers to effectively utilize commercial fertilizers, organic fertilizers, manure, and/or compost appropriately improving soil quality and minimizing runoff of nutrients from fields to surface waters. The basis for nutrient applications will be recommendations based on soil, manure, and compost analyses.

**Before Situation:**

In this geographic area, a fertility program is either nonexistent or at a basic level. Application of fertilizers, including manures, composts, and amendments, are completed annually based upon tradition that does not specifically consider the detrimental effects of improper timing or rates of nutrients, or excess nutrient buildup in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, or soil erosion, or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.

**After Situation:**

A nutrient management system will be developed to meet the current Nutrient Management (590) CPS, when applicable system will also meet NOP regulations. Development and implementation of a nutrient management plan (NMP) will benefit plant productivity while also reducing potential for off-site degradation. A nutrient management budget will be developed for each field(s) based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing is completed according to LGU recommendations. Records will be provided annually of the current soil test, analysis, application rate, forms and rates of nutrients for each field, including crop yields. Nutrient applications will be completed according to the Nutrient Management Plan that minimizes nutrient runoff and leaching or buildup of excess nutrient concentrations.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $816.43

**Scenario Cost/Unit:** $20.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 2 | $20.42 |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $45.54 | 1 | $45.54 |
| Test, Compost Analysis | 307 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $50.00 | 1 | $50.00 |

**Practice:** 590 - Nutrient Management

**Scenario** #5 - Basic Precision NM (Non-Organic/Organic)

**Scenario Description:**

This scenario takes a conventional cropping system where either no nutrient management or only a basic level of nutrient management is being practiced and improves it to address air quality (reduce emissions for N fertilizer) and/or minimize agricultural nonpoint source pollution of surface and groundwater. The planned NM system will meet the current Nutrient Management (590) CPS general and additional criteria. Precision nutrient management system includes such items as split applications, variable rate applications, nitrification or urease inhibitors, additional nutrient tests including PSNT (pre-side dress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, and/or spectral analysis may be used to further refine nutrient applications. Payment for implementation is to defray the costs of grid or zone soil testing, additional testing and analysis, equipment, implementation of the NMP and recordkeeping. Typical treatment area is 40 acres.

**Before Situation:**

In this geographic area, conventional fertility programs involve very little or no soil or manure testing. Application of fertilizers, including manures and amendments, are completed annually based upon tradition that does not specifically consider the detrimental affects of improper timing or rates of nutrients, nitrous oxide emissions or excess nutrient build-up in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Runoff flows into adjacent streams, water courses, tile drains, field surface drains, or other water courses causing degradation to receiving waters or leaching of nutrients to shallow ground water sources. There is typically no environmental evaluation of the potential for off-site movement. Soil quality may also be detrimentally affected.

**After Situation:**

A precision nutrient management system will be developed to meet the current Nutrient Management (590) CPS general and additional criteria, when applicable the system will also meet NOP regulations. Development and implementation of a Nutrient Management Plan (NMP) based on the 4Rs will benefit plant productivity while reducing potential of off-site movement of nutrients, including reducing nitrogen emissions. NMP may include practices such as use of split applications, slow release nutrients, nitrification inhibitors, urease inhibitors, proper timing of application, more appropriate formulations, banding, etc. Additional nutrient tests including PSNT (pre-side dress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, spectral analysis, etc., may also be used to further refine nutrient applications. Use of a post-harvest soil test or tissue tests will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts. Potential for offsite movement of nutrient may be further reduced by identifying variability across the field(s) by using soil survey maps or other simple techniques to establish management zones, along with grid or zone soil testing. Nutrients are applied at rates based on soil test zone analyses. Nitrogen and Phosphorus risk assessment tools are completed and results included in the nutrient management system specifications as required by current NRCS 590 CPS criteria and any mitigation measures are included in the conservation plan if determined needed by risk assessment results. Soil testing is completed according to LGU recommendations. Analysis are completed at least once every three years for N-P-K, and for N annually. A nutrient budget is developed for each field or management zone annually. Records will be provided annually of the current soil test, analysis, application rates, forms and rates of nutrients for each field, including crop yields.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $2,133.41

**Scenario Cost/Unit:** $53.34

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 2 | $55.52 |
| Satellite imagery, aerial photography, infrared | 966 | Infrared imagery | Acre | $0.17 | 40 | $6.80 |
| Chlorophyll Reader | 1125 | Applicator and chlorophyll sensor includes labor. No materials | Acre | $11.82 | 40 | $472.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 6 | $677.82 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 60 | $612.60 |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $25.03 | 1 | $25.03 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.86 | 1 | $12.86 |

**Practice:** 590 - Nutrient Management

**Scenario** #8 - Adaptive NM

**Scenario Description:**

The practice scenario is for the implementation of nutrient management on a small plot, as detailed in outlined in Agronomy Technical Note 7 - Adaptive Nutrient Management. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement various nutrient use efficiency improvement methods for timing, rate, method of application, or source of nutrients.

**Before Situation:**

The practice will be installed on cropland (small grain rotation or typical corn-soybean rotation) to address water quality degradation, air quality degradation and energy concerns. The scenario applies to non-organic and organic operations.

**After Situation:**

Installation of this scenario will result in adopting the four R's of nutrient management following the procedures outlined in Agronomy Technical Note 7 - Adaptive Nutrient Management. Implementation involves establishing the replicated plots to evaluate one or more of the 4 R's. The plot will consist of at least 4 replicated plots designed, laid out, managed and evaluated with the assistance of a consultant or extension professional knowledgeable in nutrient management and experimental design and data collection. Results are used to make nutrient application decisions to address water quality degradation issues and nutrient use efficiencies. Yields will be measured and statistically analyzed and summarized following the procedures in Agronomy Technical Note 7. The yields for each plot will be adjusted to the appropriate moisture content.

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,955.60

**Scenario Cost/Unit:** $2,955.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Satellite imagery, aerial photography, infrared | 966 | Infrared imagery | Acre | $0.17 | 1 | $0.17 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 25 | $710.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 15 | $1,694.55 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 2 | $20.42 |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $25.03 | 14 | $350.42 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.86 | 14 | $180.04 |

**Practice:** 590 - Nutrient Management

**Scenario** #275 - Small Farm, Diversified Crops

**Scenario Description:**

This scenario applies to small farms with diversified cropping systems which will improve the current level of management in applying nutrients. Improved level of management will be such to prevent nonpoint source pollution of surface and ground waters. Typical small farm size is usually 10 acres or less.

**Before Situation:**

Little to no soil or manure testing is being conducted and typically lacks a nutrient budget. Application of fertilizers, including manures and amendments, are conducted based upon traditional or no management knowledge. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion. Nutrients runoff into adjacent streams, tile drains, field surface drains, or other water courses is causing degradation to surface waters or leaching to shallow ground water sources.

**After Situation:**

Plans and specifications to manage nutrients have been developed to meet the general and additional criteria as stated in the current Nutrient Management (590) Conservation Practice Standard for either organic or non-organic operations as appropriate. A nutrient budget has been developed for each field or management zone. Nutrients are applied according to the 4 R's. (Right rate, Right time, Right place and Right source). Records needed to complete the nutrient budget are provided which may include variety of pre-season, in-season, and post-season soil nutrient and plant tissue tests and analysis; compost or manure tests; application timing, method and rate; nutrient sources; and yield data for each field or management zone. Nutrient runoff into adjacent streams is minimized improving water quality and preventing leaching into shallow ground water sources.

**Feature Measure:** Each field or management zone

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,060.06

**Scenario Cost/Unit:** $1,060.06

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| Chlorophyll Reader | 1125 | Applicator and chlorophyll sensor includes labor. No materials | Acre | $11.82 | 10 | $118.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $25.03 | 4 | $100.12 |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $45.54 | 2 | $91.08 |
| Test, Compost Analysis | 307 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $50.00 | 2 | $100.00 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.86 | 4 | $51.44 |
| Test, Soil Test, Comprehensive | 2384 | Comprehensive Soil Testing for pH, EC, nitrates, ammonium, phosphorus, potassium, and organic matter. Includes materials and shipping only. | Each | $43.53 | 4 | $174.12 |

**Practice:** 592 - Feed Management

**Scenario** #1 - Cow Dairy, Large

**Scenario Description:**

Feed ration management on a large dairy operation that does not have access to enough acres to spread all of its manure nutrients at an agronomic rate. The resource concerns are water quality degradation, excessive manure nutrients particularly phosphorus and nitrogen. The goal of the practice is to reduce the amount of nutrients in the raw manure so that it is easier for "landlocked" farmers to apply the manure at agronomic rates, thereby reducing or eliminating water quality degradation concerns. Associated practices: Nutrient management (590), Prescribed Grazing (528), Forage and Biomass Planting (512), Forage Harvest Management (511)

**Before Situation:**

Producer is feeding a higher level of protein (17%) and phosphorus (0.45%) than is needed to meet National Research Council (NRC) recommendations for a herd of this type and at this stage of production. The operation does not have all of the available acres that it needs to use the nutrients in the manure when spread at agronomic rates causing over application of nutrients on land affecting soil quality, which may lead to water quality degradation.

**After Situation:**

The scenario assumes the operation milks 500 Holstein cows at average weight of 1,400 pounds, or 700 animal units. A baseline analysis of manure, feed, and milk will be completed to determine the current nutrient inputs and outputs. The Producer will reduce feed protein and phosphorus levels to that of NRC recommendations for a herd of this type and at this stage of production (12% protein and 0.35% phosphorus). Producer will explore alternative feedstuffs and alternative feeding strategies to bring manure nitrogen and phosphorus levels down without hurting production of the animals or profitability of the operation. Alternative feeding strategies can include things like grouping animals per similar age or stage of production, or feeding based on individual rolling average production.

**Feature Measure:** Number of 1000 pound animal unit

**Scenario Unit::** Animal Unit

**Scenario Typical Size:** 700.0

**Scenario Total Cost:** $3,098.12

**Scenario Cost/Unit:** $4.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |
| **Materials** | | | | | | |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $45.54 | 4 | $182.16 |
| Test, Feed Analysis | 1989 | Representative sample of feed. Includes materials and shipping only. | Each | $37.49 | 16 | $599.84 |
| Test, MUN Testing | 1990 | Testing nitrogen level in milk as a measure of nitrogen that will be exhibited in manure. Includes materials and shipping only. | Each | $0.47 | 4 | $1.88 |

**Practice:** 592 - Feed Management

**Scenario** #2 - Dairy, Small

**Scenario Description:**

Feed ration management on a small dairy operation that does not have access to enough acres to spread all of its manure nutrients at an agronomic rate. The resource concerns are water quality degradation, excessive manure nutrients particularly phosphorus and nitrogen. The goal of the practice is to reduce the amount of nutrients in the raw manure so that it is easier for "landlocked" farmers to apply the manure at agronomic rates, thereby reducing or eliminating water quality degradation concerns. Associated practices: Nutrient management (590), Prescribed Grazing (528), Forage and Biomass Planting (512), Forage Harvest Management (511)

**Before Situation:**

Producer is feeding a higher level of protein (17%) and phosphorus (0.45%) than is needed to meet National Research Council (NRC) recommendations for a herd of this type and at this stage of production. The operation does not have all of the available acres that it needs to use the nutrients in the manure when spread at agronomic rates causing over application of nutrients on land affecting soil quality, which may lead to water quality degradation.

**After Situation:**

The scenario assumes the operation milks 50 Jersey and Guernsey cows at average weight of 1,000 pounds, or 50 animal units. A baseline analysis of manure, feed, and milk will be completed to determine the current nutrient inputs and outputs. The Producer will reduce feed protein and phosphorus levels to that of NRC recommendations for a herd of this type and at this stage of production (12% protein and 0.35% phosphorus). The producer will also implement pasturing of his herd part to the time where the animals will obtain some of their diet by grazing pastures as well as explore alternative feedstuffs and alternative feeding strategies to bring manure nitrogen and phosphorus levels down without hurting production of the animals or profitability of the operation.

**Feature Measure:** Number of 1000 pound animal unit

**Scenario Unit::** Animal Unit

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,893.18

**Scenario Cost/Unit:** $37.86

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 6 | $677.82 |
| **Materials** | | | | | | |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $45.54 | 4 | $182.16 |
| Test, Feed Analysis | 1989 | Representative sample of feed. Includes materials and shipping only. | Each | $37.49 | 8 | $299.92 |
| Test, MUN Testing | 1990 | Testing nitrogen level in milk as a measure of nitrogen that will be exhibited in manure. Includes materials and shipping only. | Each | $0.47 | 4 | $1.88 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #1 - Field Crop Less than or Equal to 20 Mitigation Index Score

**Scenario Description:**

A comprehensive IPM plan utilizing PAM's strategies will be developed in accordance with this standard to document how specific pest management risks will be prevented or mitigated on Large Scale Field/Forage Crops. Following 595 PS and Agronomy TN 5 & 9., minimum amount of planned IPM mitigation techniques needed to reduce pesticide-related resource concerns is less than or equal to 20 mitigation index score.

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

**After Situation:**

An IPM system with additional planned mitigation techniques has been implemented to help meet the minimum criteria for the identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5.

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $981.88

**Scenario Cost/Unit:** $24.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #2 - Field Crop 21 to 40 Mitigation Index Score

**Scenario Description:**

A comprehensive IPM plan utilizing PAM's strategies will be developed in accordance with this standard to document how specific pest management risks will be prevented or mitigated on Large Scale Field/Forage Crops. Following 595 PS and Agronomy TN 5 & 9., minimum amount of planned IPM mitigation techniques needed to reduce pesticide-related resource concerns is 21 to 40 mitigation index score.

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

**After Situation:**

An IPM system with additional planned mitigation techniques has been implemented to help meet the minimum criteria for the identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5.

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $1,246.88

**Scenario Cost/Unit:** $31.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 3 | $117.18 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 10 | $1,129.70 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #3 - Field Crop Greater than 40 Mitigation Index Score

**Scenario Description:**

A comprehensive IPM plan utilizing PAM's strategies will be developed in accordance with this standard to document how specific pest management risks will be prevented or mitigated on Large Scale Field/Forage Crops. Following 595 PS and Agronomy TN 5 & 9., minimum amount of planned IPM mitigation techniques needed to reduce pesticide-related resource concerns is greater than 40 mitigation index score.

**Before Situation:**

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved PAMS techniques and additional planned mitigation techniques to help meet the minimum criteria for the identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5.

**After Situation:**

An IPM system with additional planned mitigation techniques has been implemented to help meet the minimum criteria for the identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5.

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $1,550.94

**Scenario Cost/Unit:** $38.77

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 5 | $195.30 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #4 - High Value Crop Less than or Equal to 20 Mitigation Index Score

**Scenario Description:**

A comprehensive IPM plan utilizing PAM's strategies will be developed in accordance with this standard to document how specific pest management risks will be prevented or mitigated on high value crops (vegetables, orchards, vineyard). Following 595 PS and Agronomy TN 5 & 9., minimum amount of planned IPM mitigation techniques needed to reduce pesticide-related resource concerns is less than or equal to 20 mitigation index score.

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

**After Situation:**

An IPM system with additional planned mitigation techniques has been implemented to help meet the minimum criteria for the identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5.

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,060.00

**Scenario Cost/Unit:** $106.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 4 | $156.24 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #5 - High Value Crop 21 to 40 Mitigation Index Score

**Scenario Description:**

A comprehensive IPM plan utilizing PAM's strategies will be developed in accordance with this standard to document how specific pest management risks will be prevented or mitigated on high value crops (vegetable, orchard, vineyard). Following 595 PS and Agronomy TN 5 & 9., minimum amount of planned IPM mitigation techniques needed to reduce pesticide-related resource concerns is 21 - 40 mitigation index score.

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

**After Situation:**

An IPM system with additional planned mitigation techniques has been implemented to help meet the minimum criteria for the identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5.

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,364.06

**Scenario Cost/Unit:** $136.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 6 | $234.36 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 10 | $1,129.70 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #6 - High Value Crop Greater than 40 Mitigation Index Score

**Scenario Description:**

A comprehensive IPM plan utilizing PAM's strategies will be developed in accordance with this standard to document how specific pest management risks will be prevented or mitigated on High Value Crops (Vegetable, Orchard, Vineyard). Following 595 PS and Agronomy TN 5 & 9., minimum amount of planned IPM mitigation techniques needed to reduce pesticide-related resource concerns is greater than 40 mitigation index score.

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

**After Situation:**

An IPM system with additional planned mitigation techniques has been implemented to help meet the minimum criteria for the identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5.

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,746.24

**Scenario Cost/Unit:** $174.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #7 - Small Farm, Less than or Equal to 20 Mitigation Index Score

**Scenario Description:**

A comprehensive IPM plan utilizing PAM's strategies will be developed in accordance with this standard to document how specific pest management risks will be prevented or mitigated on small farm/diversified systems (e.g. CSA, Organic, etc.). Following 595 PS and Agronomy TN 5 & 9., minimum amount of planned IPM mitigation techniques needed to reduce pesticide-related resource concerns is less than or equal to 20 mitigation index score.

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

**After Situation:**

An IPM system with additional planned mitigation techniques has been implemented to help meet the minimum criteria for the identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5.

**Feature Measure:** Fields, typically 10 ac or less

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,037.78

**Scenario Cost/Unit:** $1,037.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 15 | $585.90 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #8 - Small Farm, 21 to 40 Mitigation Index Score

**Scenario Description:**

A comprehensive IPM plan utilizing PAM's strategies will be developed in accordance with this standard to document how specific pest management risks will be prevented or mitigated on small farms/diversified systems (e.g. CSA, Organic, etc.). Following 595 PS and Agronomy TN 5 & 9., minimum amount of planned IPM mitigation techniques needed to reduce pesticide-related resource concerns is 21 - 40 mitigation index score.

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

**After Situation:**

An IPM system with additional planned mitigation techniques has been implemented to help meet the minimum criteria for the identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5.

**Feature Measure:** Per fields typically 10 ac or less

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,989.02

**Scenario Cost/Unit:** $1,989.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 22 | $859.32 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 10 | $1,129.70 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #9 - Small Farm, Greater Than 40 Mitigation Index Score

**Scenario Description:**

A comprehensive IPM plan utilizing PAM's strategies will be developed in accordance with this standard to document how specific pest management risks will be prevented or mitigated on small farms/diversified system (e.g. CSA, organic, etc.) Following 595 PS and Agronomy TN 5 & 9., minimum amount of planned IPM mitigation techniques needed to reduce pesticide-related resource concerns is > 40 mitigation index score.

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

**After Situation:**

An IPM system with additional planned mitigation techniques has been implemented to help meet the minimum criteria for the identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5.

**Feature Measure:** Fields, typically 10 ac or less

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,293.08

**Scenario Cost/Unit:** $2,293.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 24 | $937.44 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #10 - Risk Prevention IPM All RCs

**Scenario Description:**

A IPM plan based primarily on LGU-approved pest prevention and avoidance techniques is applied to prevent negative impacts on all identified resource concerns. LGU-approved pest monitoring techniques and pest thresholds may also be included, but suppression techniques cannot pose any hazards to identified resource concerns. This type of system is very difficult to achieve, but may be most commonly achieved in Organic Systems that already rely heavily on prevention and avoidance techniques.

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

**After Situation:**

After implementing the 595 practice, a IPM plan based primarily on Land Grant University approved pest prevention and avoidance techniques is applied to prevent negative impacts on all identified resource concerns. Land Grant University approved pest monitoring techniques and pest thresholds may also be included, but suppression techniques cannot pose any hazards to identified resource concerns.

**Feature Measure:** Acres of management applied

**Scenario Unit::** Each

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,715.60

**Scenario Cost/Unit:** $171.56

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 15 | $585.90 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 10 | $1,129.70 |

**Practice:** 600 - Terrace

**Scenario** #1 - Broadbased

**Scenario Description:**

An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a broadbased terrace having 5:1 upstream and 5:1 downstream slopes measuring 2,500 feet in a field with slopes from 2% to 8% constructed in loam soils or similar in regards to workability. Channel and berm are farmed. A stable outlet is provided in the form of a Grassed Waterway or Underground Outlet. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.

**Before Situation:**

Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The slopes may or may not have remnant non-functioning terraces that are beyond their life. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.

**After Situation:**

A system of broadbased terraces measuring 2,500 feet in length, 2.5 height, and 5:1 front and back slopes is installed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. The installed terrace is typically farmed. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).

**Feature Measure:** Length of Terrace

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $5,875.82

**Scenario Cost/Unit:** $2.35

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 33 | $4,017.75 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 33 | $1,325.28 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 600 - Terrace

**Scenario** #2 - Flat Channel

**Scenario Description:**

An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths, and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a flat channel (level) terrace storing runoff with a length of 2,500 feet and side slopes of 8:1 or greater in a field with slopes from 2% to 8% constructed in loam soils or similar in regards to workability. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.

**Before Situation:**

Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.

**After Situation:**

A system of flat channel (level) terraces with approximately 8:1 front and back slopes, 2.5 feet height, and 2,500 feet in length is installed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. The installed terrace is typically farmed. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).

**Feature Measure:** Length of Terrace

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $9,694.25

**Scenario Cost/Unit:** $3.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 56 | $6,818.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 56 | $2,248.96 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 600 - Terrace

**Scenario** #3 - 5 to 1 & 2 to 1

**Scenario Description:**

An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a system of terraces (2,500 feet in length) that have one relatively flat (5:1) slope and one steep (2:1) slope constructed in a field with slopes from 2% to 8% installed in loam soils or similar soils in regards to workability. The steep slope is established to permanent vegetation with the flatter slope farmed. A stable outlet is provided in the form of a Grassed Waterway or Underground Outlet. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. Seeding is not included. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.

**Before Situation:**

Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.

**After Situation:**

A system of terraces with one steep (2:1) and one flat (5:1) slope measuring 2,500 feet in length and 2.5' height is installed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).

**Feature Measure:** Length of Terrace

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $3,467.33

**Scenario Cost/Unit:** $1.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 19 | $2,313.25 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 19 | $763.04 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 3 | $141.75 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 600 - Terrace

**Scenario** #4 - Narrow Base < 8%

**Scenario Description:**

An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a system of narrow base terraces with 2:1 slopes, 2,500' length, and 2.5' height in a field with slopes from 3% to 8% constructed in loam soils or similar in regards to workability. A stable outlet is provided in the form of a Grassed Waterway or Underground Outlet. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. Permanent vegetation is established. Seeding is not included. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.

**Before Situation:**

Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.

**After Situation:**

A system of narrow base terraces with approximately 2:1 front and back slopes measuring 2,500 feet in length and 2.5 feet height is constructed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).

**Feature Measure:** Length of Terrace

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $4,276.88

**Scenario Cost/Unit:** $1.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 24 | $2,922.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 24 | $963.84 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 3 | $141.75 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 600 - Terrace

**Scenario** #5 - Narrow Base > 8%

**Scenario Description:**

An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a system of narrow base terraces with 2:1 slopes, 2,500' length, and 2.5' height in a field with slopes exceeding 8% constructed in loam soils or similar in regards to workability. A stable outlet is provided in the form of a Grassed Waterway or Underground Outlet. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. Permanent vegetation is established. Seeding is not included. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.

**Before Situation:**

Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.

**After Situation:**

A system of narrow base terraces with approximately 2:1 front and back slopes measuring 2,500 feet in length and 2.5' height is constructed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).

**Feature Measure:** Length of Terrace

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $4,647.95

**Scenario Cost/Unit:** $1.86

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 26 | $3,165.50 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 26 | $1,044.16 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 601 - Vegetative Barrier

**Scenario** #2 - Seeded Barrier

**Scenario Description:**

Permanent strips of stiff, dense vegetation established along the general contour of slopes.

**Before Situation:**

Significant erosion is occurring resulting in substantial transport of sediment across the slope. A large amount of sediment is subsequently delivered to the edge of the field and/or waterways.

**After Situation:**

Implementation Requirements are prepared and implemented for the site according to the Vegetative Barrier (601) standard. A strip or strips of stiff, dense vegetation is established by seeding along the general contour of the slope that effectively settles a significant amount of sediment above the leading edge of the vegetative barrier. Barrier may also help to connect green areas to provide shelter for wildlife.

**Feature Measure:** Per 1000 Linear feet of practice ins

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $9.71

**Scenario Cost/Unit:** $0.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 0.09 | $0.98 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 0.09 | $1.89 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 0.09 | $0.68 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $68.44 | 0.09 | $6.16 |

**Practice:** 601 - Vegetative Barrier

**Scenario** #3 - Vegetative Planting

**Scenario Description:**

Permanent strips of stiff, dense vegetation established along the general contour of slopes.

**Before Situation:**

Significant erosion is occurring resulting in substantial transport of sediment across the slope. A large amount of sediment is subsequently delivered to the edge of the field and/or waterways.

**After Situation:**

Implementation Requirements are prepared and implemented for the site according to the Vegetative Barrier (601) standard. A strip or strips of stiff, dense vegetation such as Vetiver Grass is/are established along the general contour of the slope that effectively settles a significant amount of sediment above the leading edge of the vegetative barrier. Barrier may also help to connect green areas to provide shelter for wildlife.

**Feature Measure:** Per 100 foot Linear feet of practice

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $755.58

**Scenario Cost/Unit:** $7.56

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 0.01 | $0.06 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 0.01 | $0.07 |
| Ground sprigging | 1101 | Includes costs for equipment, power unit and labor. | Acre | $72.10 | 0.01 | $0.72 |
| **Materials** | | | | | | |
| Nitrogen (N), Ammonium Sulfate | 70 | Price per pound of N supplied by Ammonium Sulfate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.87 | 0.46 | $0.40 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 0.01 | $0.19 |
| One Species, Warm Season, Introduced Perennial Rhizome | 2324 | Cool season introduced perennial rhizome. Includes material and shipping only. | 100 Foot | $754.14 | 1 | $754.14 |

**Practice:** 603 - Herbaceous Wind Barriers

**Scenario** #1 - Cool Season Annual/Perennial Species

**Scenario Description:**

This scenario describes the implementation of herbaceous barriers to reduce wind velocities and wind-borne particulate matter. In this scenario barriers are composed of cool season annual or perennial vegetation. Plant materials shall be selected for local adaptation and climatic conditions and are resistant to lodging and are non-spreading in their habit. Barriers will be designed as close to perpendicular to prevailing winds as practical. Barrier direction, spacing, and composition needed to achieve the desired purpose shall be designed using the currently approved wind erosion technology.

**Before Situation:**

Typically cropland has excessive soil disturbance and unsheltered distance that results in excessive wind erosion that affect soil resources. Seedling development and wildlife habitat are negatively affected by wind-borne sediment and sediment-borne contaminants travelling offsite.

**After Situation:**

Implementation Requirements will be prepared and implemented for the site according to the Herbaceous Wind Barrier (603) standard. Implementation of herbaceous wind barriers will modify the flow and velocity of air dependent upon barrier height, porosity, spacing and wind speed. Orientation is generally placed across an entire field perpendicular to applicable prevailing wind direction. Implementation will reduce soil loss, protect growing plants from damage by wind-blown soil particles, and provide food and cover for wildlife. The scenario includes the design and implementation of annual barriers and required reestablishment.

**Feature Measure:** linear feet of barrier planted

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 1,320.0

**Scenario Total Cost:** $123.96

**Scenario Cost/Unit:** $0.09

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| **Materials** | | | | | | |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 0.09 | $3.41 |

**Practice:** 605 - Denitrifying Bioreactor

**Scenario** #13 - Denitrifying Bioreactor

**Scenario Description:**

"Scenario describes a structure containing a carbon source installed to intercept subsurface drain (tile) flow or ground water, and reduce the concentration of nitrate-nitrogen. Woodchips serve as the carbon source necessary to the denitrification process. This bioreactor has geotextile fabric (or polyethylene - PE) between the wood chips and the surrounding soil plus the following components: woodchip filled pit, two water control structures (to allow management of the flow rate and free water elevation within the bioreactor), and piping to convey water to and from the bioreactor. Woodchips serve as the carbon source necessary to the denitrification process. Associated practices: Subsurface Drain (606), Structure for Water Control (587), Drainage Water Management (554). Resource concern: Water Quality Degradation - Excess nutrients in surface and ground waters. Management and maintenance of the bioreactor (including chip replenishment), as well as monitoring and reporting to demonstrate the performance of the practice are not included in this scenario."

**Before Situation:**

Before the installation, the subsurface drainage system is contributing nitrates to a surface water source (ditch or stream), high nitrates are a resource concern to the receiving water, and it is feasible to install a bioreactor to reduce the nitrate load from drainage outflows.

**After Situation:**

Bioreactor has geotextile fabric (or polyethylene - PE) between the wood chips and the surrounding soil plus the following components: woodchip filled pit, two water control structures (to allow management of the flow rate and free water elevation within the bioreactor), and piping to convey water to and from the bioreactor. The approximate bioreactor excavated pit volume is 333 cubic yards (e.g. 6 feet deep, 15 feet wide and 100 feet long). Woodchips occupy the 6 feet of the pit plus 10% crowned (366 cu. yd.) and will be mounded above ground level to shed precipitation. A geotextile fabric (or PE material) surrounds the chips to prevent migration of soil into the pit. Water control structures should be installed using practice standard (587) Structure for Water Control. Two inline water control structures are in place. Upper WCS connected to the upper 6" diameter single-wall CPT manifold pipe (15' each, note that 6' HDPE dual wall is the only type available and used in the scenario components) by 6" diameter dual wall pipe (20' each). 20' of 6" dual wall pipe connects the downstream manifold to the lower WCS which is connected back to the main with additional 20' of 6" dual wall pipe. Flow rates are dependent upon the availability of drainage water from the 10' drainage mainline. 40' of mainline is replaced with non-perforated 10' above and below the upper WCS. The soil excavated from the pit is spoiled onto the nearby field. Associated practices: Subsurface Drain (606), Structure for Water Control (587), Drainage Water Management (554).

**Feature Measure:** Volume of Pit excavation

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 333.0

**Scenario Total Cost:** $17,427.90

**Scenario Cost/Unit:** $52.34

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 807 | $2,057.85 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 333 | $769.23 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 333 | $1,195.47 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 8 | $350.24 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.87 | 366 | $8,370.42 |
| Trenching, Earth, 24" x 60" | 1460 | Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling. | Foot | $3.71 | 50 | $185.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| **Materials** | | | | | | |
| Pipe, HDPE, 6", CPT, Single Wall | 1242 | Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only. | Foot | $1.15 | 90 | $103.50 |
| Water Level Control Structure, Inline, 2 Baffle, 10" diameter | 2021 | Inline Inlet WCS 6' High x 10" Dia.connections , 2 baffle (3 compartments) | Each | $1,969.49 | 1 | $1,969.49 |
| Water Control Structure, Stoplog, Inline, fixed costs portion | 2145 | Fixed cost portion of Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Fixed cost portion. Materials only. | Each | $318.35 | 1 | $318.35 |
| Water Control Structure, Stoplog, Inline, variable cost portion | 2146 | Variable cost portion of a Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Calculate total variable costs by multiplying by the structure height x pipe diameter. Materials only. | Height x Diameter | $12.30 | 60 | $738.00 |
| Pipe, HDPE, CPT, Double Wall, Water Tight, 10" | 2204 | Pipe, Corrugated HDPE Double Wall 10" diameter with water tight joints meeting ASTM F477. Material cost only. | Foot | $6.23 | 40 | $249.20 |

**Mobilization**

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 605 - Denitrifying Bioreactor

**Scenario** #14 - Denitrifying Bioreactor, No Liner

**Scenario Description:**

"Scenario describes a structure containing a carbon source installed to intercept subsurface drain (tile) flow or ground water, and reduce the concentration of nitrate-nitrogen. Woodchips serve as the carbon source necessary to the denitrification process. This bioreactor has the following components: woodchip filled pit, a soil cover, two water control structures (to allow management of the flow rate and free water elevation within the bioreactor), and piping to convey water to and from the bioreactor. Woodchips serve as the carbon source necessary to the denitrification process. Associated practices: Subsurface Drain (606), Structure for Water Control (587), Drainage Water Management (554). Resource concern: Water Quality Degradation - Excess nutrients in surface and ground waters. Management and maintenance of the bioreactor (including chip replenishment), as well as monitoring and reporting to demonstrate the performance of the practice are not included in this scenario.

**Before Situation:**

Before the installation, the subsurface drainage system is contributing nitrates to a surface water source (ditch or stream), high nitrates are a resource concern to the receiving water, and it is feasible to install a bioreactor to reduce the nitrate load from drainage outflows.

**After Situation:**

Bioreactor has the following components: woodchip filled pit, a soil cover, two water control structures (to allow management of the flow rate and free water elevation within the bioreactor), and piping to convey water to and from the bioreactor. The approximate bioreactor excavated pit volume is 333 cubic yards (e.g. 6 feet deep, 15 feet wide and 100 feet long). Woodchips occupy the lower 4 feet of the pit (222 cu. yd.) and a soil blanket over the woodchips is 2.0 ft. and will be mounded above ground level to shed precipitation. A geotextile fabric (or PE material) surrounds the chips to prevent migration of soil into the pit. Water control structures should be installed using practice standard (587) Structure for Water Control. Two inline water control structures are in place. Upper WCS connected to the upper 6' diameter single-wall CPT manifold pipe (15' each, note that 6' HDPE dual wall is the only type available and used in the scenario components) by 6' diameter dual wall pipe (20' each). 20' of 6' dual wall pipe connects the downstream manifold to the lower WCS which is connected back to the main with additional 20' of 6' dual wall pipe. Flow rates are dependent upon the availability of drainage water from the 10' drainage mainline. 40' of mainline is replaced with non-perforated 10' above and below the upper WCS. The soil excavated from the pit is spoiled onto the nearby field. Associated practices: Subsurface Drain (606), Structure for Water Control (587), Drainage Water Management (554).

**Feature Measure:** Volume of Carbon Source

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 222.0

**Scenario Total Cost:** $11,249.06

**Scenario Cost/Unit:** $50.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 333 | $769.23 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 200 | $718.00 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.87 | 222 | $5,077.14 |
| Trenching, Earth, 24" x 60" | 1460 | Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling. | Foot | $3.71 | 50 | $185.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| **Materials** | | | | | | |
| Pipe, HDPE, 6", CPT, Single Wall | 1242 | Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only. | Foot | $1.15 | 90 | $103.50 |
| Water Level Control Structure, Inline, 2 Baffle, 10" diameter | 2021 | Inline Inlet WCS 6' High x 10" Dia.connections , 2 baffle (3 compartments) | Each | $1,969.49 | 1 | $1,969.49 |
| Water Control Structure, Stoplog, Inline, fixed costs portion | 2145 | Fixed cost portion of Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Fixed cost portion. Materials only. | Each | $318.35 | 1 | $318.35 |
| Water Control Structure, Stoplog, Inline, variable cost portion | 2146 | Variable cost portion of a Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Calculate total variable costs by multiplying by the structure height x pipe diameter. Materials only. | Height x Diameter | $12.30 | 60 | $738.00 |
| Pipe, HDPE, CPT, Double Wall, Water Tight, 10" | 2204 | Pipe, Corrugated HDPE Double Wall 10" diameter with water tight joints meeting ASTM F477. Material cost only. | Foot | $6.23 | 40 | $249.20 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 606 - Subsurface Drain

**Scenario** #1 - Single-Wall Pipe, <= 6 inch

**Scenario Description:**

Description: Below ground installation of perforated HDPE, Single-wall Corrugated Plastic Pipe, 6" or less, using a drainage plow. Resource Concerns: Excess Water (Seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management.

**Before Situation:**

Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).

**After Situation:**

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 5-inch. Construct 2,000 feet of 5-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth 5 feet. The unit is in weight of pipe material in pounds. 2,000 feet of 5-inch, Single-Wall, perforated HDPE CPP weighs 0.50 lb/ft, or a total of 1,000 pounds. The typical number of mainline connections for 2,000 feet of subsurface drainline is a total of 3 each.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $8,046.63

**Scenario Cost/Unit:** $8.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, tile line plowing, earth, 60" | 1457 | Plowing in 3"-15" CPP drain line into earth, 60" depth, includes equipment and labor for trenching, laying, and backfilling. | Foot | $2.34 | 2000 | $4,680.00 |
| **Materials** | | | | | | |
| Pipe, HDPE, corrugated single wall, <= 12" weight priced Compound | 1380 | High Density Polyethylene (HDPE) compound manufactured into single wall corrugated pipe or tubing. Materials only. | Pound | $1.83 | 1000 | $1,830.00 |
| Drainage Lateral Connection | 1458 | Connect 3"-6" drainage lateral to main drain, includes excavation to 6' depth, install tee on main line, connect lateral, and backfill. Includes material cost for tee. | Each | $28.71 | 3 | $86.13 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 606 - Subsurface Drain

**Scenario** #2 - Single-Wall Pipe, <= 6 inch, Enveloped

**Scenario Description:**

Description: Below ground installation of perforated HDPE, Single-wall Corrugated Plastic Pipe, 6" or less, with Sand-Gravel envelope, using a drainage trencher. Resource Concerns: Excess Water (seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management.

**Before Situation:**

Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).

**After Situation:**

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 5-inch. Construct 2,000 feet of 5-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth of 5 feet, and surrounded with a sand-gravel envelope. The unit is in weight of pipe material in pounds. 2,000 feet of 5-inch, Single-Wall, perforated HDPE CPP weighs 0.50 lb/ft, or a total of 1,000 pounds. The typical volume sand-gravel for 2,000 feet of 12"wide x 12" high envelope is 64 cubic yards. The typical number of mainline connections for 2,000 feet of subsurface drainline is a total of 3 each.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $10,003.67

**Scenario Cost/Unit:** $10.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Track Loader, 95HP | 935 | Equipment and power unit costs. Labor not included. | Hour | $86.55 | 8 | $692.40 |
| Trenching, Earth, 12" x 60" | 1459 | Trenching, earth, 12" wide x 60" depth, includes equipment and labor for trenching, laying 3"-6" CPP drain line with envelope, and backfilling. | Foot | $1.90 | 2000 | $3,800.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 64 | $1,823.36 |
| Pipe, HDPE, corrugated single wall, <= 12" weight priced Compound | 1380 | High Density Polyethylene (HDPE) compound manufactured into single wall corrugated pipe or tubing. Materials only. | Pound | $1.83 | 1000 | $1,830.00 |
| Drainage Lateral Connection | 1458 | Connect 3"-6" drainage lateral to main drain, includes excavation to 6' depth, install tee on main line, connect lateral, and backfill. Includes material cost for tee. | Each | $28.71 | 3 | $86.13 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 606 - Subsurface Drain

**Scenario** #3 - Single-Wall Pipe, >= 8 inch

**Scenario Description:**

Description: Below ground installation of HDPE, Single-wall Corrugated Plastic Pipe, 8" or larger, using a drainage plow. Resource Concerns: Excess Water (Seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 607 - Surface Drain, Field Ditch; 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management.

**Before Situation:**

Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).

**After Situation:**

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 10-inch. Construct 1,000 feet of 10-inch, Single-Wall, HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth 5 feet. The unit is in weight of pipe material in pounds. 1,000 feet of 10-inch, Single-Wall, HDPE CPP weighs 1.80 lb/ft, or a total of 1,800 pounds.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 1,800.0

**Scenario Total Cost:** $6,585.92

**Scenario Cost/Unit:** $3.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, tile line plowing, earth, 60" | 1457 | Plowing in 3"-15" CPP drain line into earth, 60" depth, includes equipment and labor for trenching, laying, and backfilling. | Foot | $2.34 | 1000 | $2,340.00 |
| **Materials** | | | | | | |
| Pipe, HDPE, corrugated single wall, <= 12" weight priced Compound | 1380 | High Density Polyethylene (HDPE) compound manufactured into single wall corrugated pipe or tubing. Materials only. | Pound | $1.83 | 1800 | $3,294.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 606 - Subsurface Drain

**Scenario** #4 - Twin-Wall Pipe, >= 8 inch

**Scenario Description:**

Description: Below ground installation of HDPE, Twin-wall Corrugated Plastic Pipe, 8" or larger, using a drainage plow. Resource Concerns: Excess Water (Seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 607 - Surface Drain, Field Ditch; 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management.

**Before Situation:**

Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).

**After Situation:**

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management. HDPE (CPP) Twin-Wall is manufactured in sizes (nominal diameter) from 4-inch to 60-inch; typical practice sizes range from 8-inch to 15-inch; and typical scenario size is 12-inch. Construct 1,000 feet of 12-inch, Twin-Wall, HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth 5 feet. The unit is in weight of pipe material in pounds. 1,000 feet of 12-inch, Twin-Wall, HDPE CPP weighs 3.2 lb/ft, or a total of 3,200 pounds.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 3,200.0

**Scenario Total Cost:** $12,910.00

**Scenario Cost/Unit:** $4.03

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 24" x 60" | 1460 | Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling. | Foot | $3.71 | 1000 | $3,710.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| **Materials** | | | | | | |
| Pipe, HDPE, corrugated double wall, LTE-12", soil tight, weight priced | 1587 | High Density Polyethylene (HDPE) compound manufactured into double wall corrugated pipe LTE-12" diameter. Materials only. | Pound | $2.52 | 3200 | $8,064.00 |

**Practice:** 607 - Surface Drain, Field Ditch

**Scenario** #1 - Drainage Ditch, <=3ft deep

**Scenario Description:**

This scenario is the construction of a surface drain, field ditch, 2-3 feet deep. Typical construction dimensions are 4' bottom x 2.5' deep x 1320' length with a side slope of 3:1. Excess water is either reused in an Irrigation System, Tailwater Recovery (447) system, or conveyed to a receiving water body. If a drain deeper than 3 feet is needed, use the "Variable Size, CuYds" scenario. Resource concerns: Excess/Insufficient Water - Inefficient Use of Irrigation Water and Water Quality Degradation - Excessive Sediment in Surface Waters. Associated Conservation Practices: 608-Surface Drain, Main or Lateral; 587 -Structure For Water Control; 554 - Drainage Water Management

**Before Situation:**

Excess water has no outlet and backs up into the fields causing damage or loss of the crop.

**After Situation:**

An earthen ditch that follows the natural slope of the land at the low end of the field will be constructed to carry excess water to an outlet.

**Feature Measure:** Linear Feet of Ditch

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,320.0

**Scenario Total Cost:** $4,392.75

**Scenario Cost/Unit:** $3.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 1406 | $3,247.86 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 5 | $608.75 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 5 | $200.80 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 607 - Surface Drain, Field Ditch

**Scenario** #2 - Drainage Ditch, >3ft deep

**Scenario Description:**

This scenario is the construction of a surface drain, field ditch, calculated in CuYds. Typical construction dimensions are 4' bottom x 5' deep x 1320' length with a side slope of 3:1. Excess water is either reused in an Irrigation System, Tailwater Recovery (447) system, or conveyed to a receiving water body. Resource concerns: Excess/Insufficient Water - Inefficient Use of Irrigation Water and Water Quality Degradation - Excessive Sediment in Surface Waters. Associated Conservation Practices: 608-Surface Drain, Main or Lateral; 587 -Structure For Water Control; 554 - Drainage Water Management

**Before Situation:**

Excess water has no outlet and backs up into the fields causing damage or loss of the crop.

**After Situation:**

An earthen ditch that follows the natural slope of the land at the low end of the field will be constructed to carry excess water to an outlet.

**Feature Measure:** Volume of Excavation

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 4,645.0

**Scenario Total Cost:** $12,360.57

**Scenario Cost/Unit:** $2.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 4645 | $10,729.95 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 8 | $974.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 608 - Surface Drain, Main or Lateral

**Scenario** #1 - Main or Lateral Drainage Ditch

**Scenario Description:**

This scenario is the construction of a surface drain, main or lateral. Typical construction dimensions are 4' wide bottom x 4' deep x 1320' length with a side slope of 2.5:1. If needed, seeding should be contracted under Critical Area Planting-342. Resource Concerns: Excess/Insufficient Water - Inefficient Use of Irrigation Water and Water Quality Degradation - Excessive Sediment in Surface Waters. Associated Conservation Practices: 607-Surface Drain, Field Ditch; 587 -Structure For Water Control; 554 Drainage Water Management; 342 Critical Area Planting.

**Before Situation:**

Excess water has no outlet and backs up into the fields causing damage or loss of the crop.

**After Situation:**

An earthen ditch that follows the natural slope of the land at the low end of the field is constructed to carry excess water to an outlet so that water no longer backs up into the field so that field production is improved.

**Feature Measure:** Volume of Earth Excavated

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,738.0

**Scenario Total Cost:** $8,111.55

**Scenario Cost/Unit:** $2.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 2738 | $6,324.78 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 10 | $1,217.50 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 10 | $401.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 610 - Salinity and Sodic Soil Management

**Scenario** #1 - Soil Management (non-Irrigated)

**Scenario Description:**

The producer secures training in Salinity and Sodic Soil Management, analyzes subsurface conditions in areas in and around a saline seep and using information gained from training and field observations carries out a Salinity and Sodic Soil Management Plan employing as applicable changes in Conservation Cropping Systems, Critical Area Planting, Nutrient Management and use of soil amendments. Scenario includes cost of attending a 6 hr University, NRCS, or commodity group sponsored training session and 40 hours of mgmt. labor a year to analyze available data and field situation, then review, and modify as necessary the Salinity and Sodic Soil Management Plan and continue to carry it out. Resource Concerns: Soil Quality Degradation - Concentration of salts or other chemicals, and Water Quality Degradation- Excessive salts in surface and ground waters. Associated Practices: 328 -Conservation Cropping System; 342- Critical Area Planting; and 590 - Nutrient Management.

**Before Situation:**

A crop-fallow system on sodic and saline soils has resulted in saline seeps. The recharge area of the seep must be determined before the extents of the treatment can be planned. An analyses of the subsurface conditions in areas in and around a saline is completed on 95 acres of recharge area surrounding a 5 acre saline seep in order to determine groundwater gradients and limits of the recharge area.

**After Situation:**

A determination of extent of recharge area has been made. The area to be treated has been identified. The producer has developed and is carrying out a Salinity and Sodic Soil Management Plan. Deep percolation in the recharge area is eliminated and salts no longer leach into the ground or surface water.

**Feature Measure:** Acres included in Salinity and Sodic

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,955.00

**Scenario Cost/Unit:** $19.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |

**Practice:** 610 - Salinity and Sodic Soil Management

**Scenario** #2 - Soil Management (Irrigated)

**Scenario Description:**

The producer secures training in Salinity and Sodic Soil Management and develops and carries out a Salinity and Sodic Soil Management Plan. Scenario includes cost of attending a 6 hr University, NRCS, or commodity group sponsored training session and 12 hours of mgmt. labor a year to analyze available data and field situation, develop (or review and modify as necessary) plan and carry it out. Resource Concerns: Soil Quality Degradation - Concentration of salts or other chemicals, and Water Quality Degradation- Excessive salts in surface and ground waters. Associated Practices: 328-Conservation Crop Rotation; 449-Irrigation Water Management; and 590-Nutrient Management.

**Before Situation:**

Salinity and or Sodic conditions have developed in the root zone of a 100 acre irrigated cropland field resulting in decreased soil quality, plant health problems, and yield reductions.

**After Situation:**

Producer conducts soil conductivity and salinity test to determine the root zone depth of water application necessary for flushing accumulated salts and maintaining a proper salt balance. Producer conducts irrigation suitability test of water supply results to determine suitability of applied water for irrigation and additional irrigation volumes needed for leaching. Routine periodic checks of water EC will be conducted by producer to monitor for water salinity which might require changes to Salinity and Sodic Soil Management Plan. The Salinity and Sodic Soil Management Plan is carried out employing soil and water testing and as applicable changes in Irrigation Water Management (449), Conservation Crop Rotation (328), tillage, and use of soil amendments. The producer has developed and is carrying out a Salinity and Sodic Soil Management Plan resulting in improved soil quality and plant health.

**Feature Measure:** Acres included in Salinity and Sodic

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,124.86

**Scenario Cost/Unit:** $21.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| **Materials** | | | | | | |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.48 | 12 | $125.76 |
| Test, Standard Water Test, Irrigation Suitability | 310 | Irrigation water suitability lab analysis. Includes pH, alkalinity, carbonates/bicarbonates, EC, dissolved solids, B, Cl, Ca, Mg, Na, SAR, and hardness. | Each | $44.10 | 1 | $44.10 |

**Practice:** 610 - Salinity and Sodic Soil Management

**Scenario** #3 - Mgmt, gyp 1 to 4 ton/ac

**Scenario Description:**

The producer carries out a Salinity and Sodic Soil Management Plan on a 20 ac field. Scenario includes cost of 25 hours of mgmt. labor a year to analyze available data and field situation, develop (or review and modify as necessary) plan and carry it out and the application of 1 to 4 ton/ac of quarry run gypsum. The gypsum will be applied once during a 3 year period. Resource Concerns: Soil Quality Degradation - Concentration of salts or other chemicals, and Water Quality Degradation- Excessive salts in surface and ground waters. Associated Practices: 328-Conservation Crop Rotation; 449-Irrigation Water Management; and 590-Nutrient Management.

**Before Situation:**

Sodic conditions have developed in the root zone of a 20 acre irrigated cropland field resulting in decreased soil quality, plant health problems, and yield reductions.

**After Situation:**

Producer conducts soil conductivity and salinity test to determine gypsum requirements and to determine the root zone depth of water application necessary for flushing accumulated salts and maintaining a proper salt balance. Gypsum is applied. Producer conducts irrigation suitability test of water supply results to determine suitability of applied water for irrigation and additional irrigation volumes needed for leaching. Routine periodic checks of water EC will be conducted by producer to monitor for water salinity which might require changes to Salinity and Sodic Soil Management Plan. The Salinity and Sodic Soil Management Plan is carried out employing soil and water testing and as applicable changes in Irrigation Water Management (449), Conservation Crop Rotation (328), tillage, and use of soil amendments. The producer has developed and is carrying out a Salinity and Sodic Soil Management Plan resulting in improved soil quality and plant health.

**Feature Measure:** Acres included in Salinity and Sodic

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $3,651.63

**Scenario Cost/Unit:** $182.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 20 | $208.80 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 25 | $1,181.25 |
| **Materials** | | | | | | |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.48 | 6 | $62.88 |
| Test, Standard Water Test, Irrigation Suitability | 310 | Irrigation water suitability lab analysis. Includes pH, alkalinity, carbonates/bicarbonates, EC, dissolved solids, B, Cl, Ca, Mg, Na, SAR, and hardness. | Each | $44.10 | 1 | $44.10 |
| Gypsum, Ground Ag Grade, Bulk | 1224 | Agricultural grade quarry ground gypsum ($CaCO_4$) for dispersive soil treatment. Materials and delivery only. | Ton | $35.91 | 60 | $2,154.60 |

**Practice:** 610 - Salinity and Sodic Soil Management

**Scenario** #4 - Mgmt, gyp >4 to 8 ton/ac

**Scenario Description:**

The producer carries out a Salinity and Sodic Soil Management Plan on a 20 ac field. Scenario includes cost of 25 hours of mgmt. labor a year to analyze available data and field situation, develop (or review and modify as necessary) plan and carry it out and the application of greater than 4 but not more than 8 tons/ac of quarry run gypsum. The gypsum will be applied once during a 3 year period. Resource Concerns: Soil Quality Degradation - Concentration of salts or other chemicals, and Water Quality Degradation- Excessive salts in surface and ground waters. Associated Practices: 328-Conservation Crop Rotation; 449-Irrigation Water Management; and 590-Nutrient Management.

**Before Situation:**

Sodic conditions have developed in the root zone of a 20 acre irrigated cropland field resulting in decreased soil quality, plant health problems, and yield reductions.

**After Situation:**

Producer conducts soil conductivity and salinity test to determine gypsum requirements and to determine the root zone depth of water application necessary for flushing accumulated salts and maintaining a proper salt balance. Gypsum is applied. Producer conducts irrigation suitability test of water supply results to determine suitability of applied water for irrigation and additional irrigation volumes needed for leaching. Routine periodic checks of water EC will be conducted by producer to monitor for water salinity which might require changes to Salinity and Sodic Soil Management Plan. The Salinity and Sodic Soil Management Plan is carried out employing soil and water testing and as applicable changes in Irrigation Water Management (449), Conservation Crop Rotation (328), tillage, and use of soil amendments. The producer has developed and is carrying out a Salinity and Sodic Soil Management Plan resulting in improved soil quality and plant health.

**Feature Measure:** Acres included in Salinity and Sodic

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $7,242.63

**Scenario Cost/Unit:** $362.13

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 20 | $208.80 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 25 | $1,181.25 |
| **Materials** | | | | | | |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.48 | 6 | $62.88 |
| Test, Standard Water Test, Irrigation Suitability | 310 | Irrigation water suitability lab analysis. Includes pH, alkalinity, carbonates/bicarbonates, EC, dissolved solids, B, Cl, Ca, Mg, Na, SAR, and hardness. | Each | $44.10 | 1 | $44.10 |
| Gypsum, Ground Ag Grade, Bulk | 1224 | Agricultural grade quarry ground gypsum (CaCO4) for dispersive soil treatment. Materials and delivery only. | Ton | $35.91 | 160 | $5,745.60 |

**Practice:** 610 - Salinity and Sodic Soil Management

**Scenario** #5 - Mgmt, gyp > 8 ton/ac

**Scenario Description:**

The producer carries out a Salinity and Sodic Soil Management Plan on a 20 ac field. Scenario includes cost of 25 hours of mgmt. labor a year to analyze available data and field situation, develop (or review and modify as necessary) plan and carry it out and the application of over 8 ton/ac of quarry run gypsum. The gypsum will be applied once during a 3 year period. Resource Concerns: Soil Quality Degradation - Concentration of salts or other chemicals, and Water Quality Degradation- Excessive salts in surface and ground waters. Associated Practices: 328-Conservation Crop Rotation; 449-Irrigation Water Management; and 590-Nutrient Management.

**Before Situation:**

Sodic conditions have developed in the root zone of a 20 acre irrigated cropland field resulting in decreased soil quality, plant health problems, and yield reductions.

**After Situation:**

Producer conducts soil conductivity and salinity test to determine gypsum requirements and to determine the root zone depth of water application necessary for flushing accumulated salts and maintaining a proper salt balance. Gypsum is applied. Producer conducts irrigation suitability test of water supply results to determine suitability of applied water for irrigation and additional irrigation volumes needed for leaching. Routine periodic checks of water EC will be conducted by producer to monitor for water salinity which might require changes to Salinity and Sodic Soil Management Plan. The Salinity and Sodic Soil Management Plan is carried out employing soil and water testing and as applicable changes in Irrigation Water Management (449), Conservation Crop Rotation (328), tillage, and use of soil amendments. The producer has developed and is carrying out a Salinity and Sodic Soil Management Plan resulting in improved soil quality and plant health.

**Feature Measure:** Acres included in Salinity and Sodic

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $10,115.43

**Scenario Cost/Unit:** $505.77

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 20 | $208.80 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 25 | $1,181.25 |
| **Materials** | | | | | | |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.48 | 6 | $62.88 |
| Test, Standard Water Test, Irrigation Suitability | 310 | Irrigation water suitability lab analysis. Includes pH, alkalinity, carbonates/bicarbonates, EC, dissolved solids, B, Cl, Ca, Mg, Na, SAR, and hardness. | Each | $44.10 | 1 | $44.10 |
| Gypsum, Ground Ag Grade, Bulk | 1224 | Agricultural grade quarry ground gypsum ($CaCO_4$) for dispersive soil treatment. Materials and delivery only. | Ton | $35.91 | 240 | $8,618.40 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #1 - Reforestation, <1 ac, Hand planting, Per Tree

**Scenario Description:**

Tree seedlings will be hand planted on less than 1 acre of forestland where few or no forest trees are growing, the existing stand of trees needs underplanting, or the previously planted seedling tree stocking level is below desirable conditions. Wildlife habitat is degraded by loss of forest conditions. This resource concern addressed is degraded plant condition - inadequate structure and composition; and inadequate wildlife & fish habitat. The typical tree/shrub planting includes a small (up to 1 sqft) scalp, planting the seedling, and travel between planting spots.

**Before Situation:**

The stocking level of the forest does not meet the minimum recommended number of trees per acre. The existing condition of the forest stand does not meet the landowners objectives. To be a viable forest additional seedlings need planting. Wildlife habitat is rated poor.

**After Situation:**

The prescribed number of trees are hand planted on <1 acre, and the objectives of the landowner are met. The forest will provide wildlife habitat, provide a long term ground cover, and capture atmospheric carbon.

**Feature Measure:** Each Planted Seedling

**Scenario Unit::** Each

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $706.78

**Scenario Cost/Unit:** $2.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 2.5 | $30.90 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 6.5 | $184.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, bare root, 2-1 | 1514 | Bare root conifer trees, 2-1 (3 years old). Includes materials and shipping only. | Each | $0.60 | 150 | $90.00 |
| Tree, conifer, seedling, containerized, 20 cu. in. | 1521 | Containerized conifer stock, 20 cubic inches (e.g. "Styro 45" plug), 2.4" x 6". Includes materials and shipping only. | Each | $1.13 | 150 | $169.50 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #2 - Reforestation, <1 ac., Hand planting, Browse protection, Per Tree

**Scenario Description:**

Tree seedlings will be hand planted on less than 1 acre of forestland where few or no forest trees are growing, the existing stand of trees needs underplanting, or the previously planted seedling tree stocking level is below desirable conditions. Wildlife habitat has been degraded by loss of forest conditions. The typical tree/shrub planting is done after general site preparation but includes a small (up to 1 sqft) scalp at time of planting, planting the seedling, and travel between planting spots. Seedlings are protected from wildlife browsing. This resource concern addressed is degraded plant condition and inadequate structure and composition; and inadequate wildlife & fish habitat.

**Before Situation:**

The stocking level does not meet the minimum recommended number of trees per acre and does not meet the landowners objectives. To be a viable forest additional seedlings need planting. Wildlife habitat is rated poor. Wildlife are known to browse tree seedlings in the area causing great damage.

**After Situation:**

The prescribed number of trees are hand planted on <1 acre, and the objectives of the landowner are met. Seedlings are protected from wildlife browsing by installing some type of protection devise. A forest will provide wildlife habitat, provide a long term ground and capture atmospheric carbon.

**Feature Measure:** Each Planted Seedling

**Scenario Unit::** Each

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $1,250.68

**Scenario Cost/Unit:** $4.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 2.5 | $30.90 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, bare root, 2-1 | 1514 | Bare root conifer trees, 2-1 (3 years old). Includes materials and shipping only. | Each | $0.60 | 150 | $90.00 |
| Tree, conifer, seedling, containerized, 20 cu. in. | 1521 | Containerized conifer stock, 20 cubic inches (e.g. "Styro 45" plug), 2.4" x 6". Includes materials and shipping only. | Each | $1.13 | 150 | $169.50 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.53 | 100 | $53.00 |
| Tree shelter, solid tube type, 3-1/4" x 24" | 1559 | 3-1/4" x 24" tree tube for protection from animal damage. Materials only. | Each | $1.45 | 100 | $145.00 |
| Tree shelter, solid tube type, 4" x 18" | 1562 | 4" x 18" tree tube for protection from animal damage. Materials only. | Each | $1.16 | 100 | $116.00 |
| Stake, bamboo, 3/8" x 36" | 1584 | 3/8" x 36" bamboo stakes to anchor items in place. Inlcudes materials and shipping only. | Each | $0.12 | 300 | $36.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #3 - Reforestation, 1 acre or more, Hand planting

**Scenario Description:**

This practice involves planting of tree seedlings on areas 1 acre or more after the site has been prepared for seedling growth and establishment. The productivity of the site is good and will handle a high density planting rate (about 450 TPA). Terrain is moderately to steeply sloping, too steep to be planted with a mechanical tree planter so the area is hand planted. Resource concerns addressed are degraded plant condition - undesirable plant productivity and health, and inadequate structure and composition; soil erosion; and degraded wildlife habitat. The typical tree/shrub planting implementation is post 490 Tree & Shrub Site Preparation and includes a small (up to 1sqft) scalp, tree or shrub planting and travel between planting spots.

**Before Situation:**

The land has a little/no tree cover, or is stocked with the wrong tree species. Competing vegetation is a before and after planting concern. Soil condition is degraded due to the loss of the native forest ecosystem (organic matter in top soil depleted). The main resource concerns are degraded plant condition and inadequate structure and composition

**After Situation:**

40 acres of land is established with permanent tree cover that will improve degraded plant condition, reduce soil erosion, establish wildlife habitat, sequester carbon and reduce invasive species presence. Establishing forest vegetation also creates corridors for wildlife movement.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $22,123.30

**Scenario Cost/Unit:** $553.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 80 | $1,711.20 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 160 | $1,977.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 230 | $6,532.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 50 | $2,362.50 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, bare root, 1-1 | 1513 | Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only. | Each | $0.46 | 9000 | $4,140.00 |
| Tree, conifer, seedling, bare root, 2-1 | 1514 | Bare root conifer trees, 2-1 (3 years old). Includes materials and shipping only. | Each | $0.60 | 9000 | $5,400.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #4 - Reforestation, 1 acre or more, Hand planting, Browse protection

**Scenario Description:**

This practice involves planting of tree seedlings on areas 1 acre or more after the site has been prepared for seedling growth and establishment. The productivity of the site is good and will handle a medium to high density planting rate (300-450 TPA). Newly planted seedlings are protected from browsing by installing tree tubes. Terrain is moderately to steeply sloping, too steep to be planted with a mechanical tree planter so the area is hand planted. Resource concerns addressed are degraded plant condition - undesirable plant productivity and health, inadequate structure and composition; and degraded wildlife habitat. The typical tree/shrub planting implementation is post 490 Tree & Shrub Site Preparation and includes a small (up to 1sqft) scalp, tree or shrub planting and travel between planting spots.

**Before Situation:**

The land has a little/no tree cover, or is stocked with the wrong tree species. Competing vegetation is a before and after planting concern. Soil condition is degraded due to the loss of the native forest ecosystem (organic matter in top soil depleted). The main resource concern is degraded plant condition and inadequate structure and composition

**After Situation:**

40 acres of land is established with permanent tree cover that will improve degraded plant condition, reduce soil erosion, establish wildlife habitat, sequester carbon and reduce invasive species presence. Establishing forest vegetation also creates corridors for wildlife movement. Trees protected from animal damage.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $36,118.22

**Scenario Cost/Unit:** $902.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 48 | $1,026.72 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 150 | $1,854.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 250 | $7,100.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 50 | $2,362.50 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, bare root, 2-1 | 1514 | Bare root conifer trees, 2-1 (3 years old). Includes materials and shipping only. | Each | $0.60 | 15000 | $9,000.00 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.53 | 7500 | $3,975.00 |
| Tree shelter, solid tube type, 4" x 18" | 1562 | 4" x 18" tree tube for protection from animal damage. Materials only. | Each | $1.16 | 7500 | $8,700.00 |
| Stakes, bamboo 3/8" x 48" | 1585 | 3/8" x 48" bamboo stakes to anchor items in place. Inlcudes materials and shipping only. | Each | $0.14 | 15000 | $2,100.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #5 - Medium Density, Mechanical Planting

**Scenario Description:**

This practice involves planting of tree seedlings after the site has been prepared for seedling growth and establishment. The productivity of the site is good and will handle a medium density planting rate (300-450 trees per acre). Terrain is moderately sloping and will be planted with a mechanical tree planter. Smaller size seedlings (1-0) are planted. The resource concerns addressed is degraded plant condition - undesirable plant productivity and health, and inadequate structure and composition; and degraded wildlife habitat.

**Before Situation:**

The land has a little or no tree cover, or is stocked with the wrong tree species. Competing vegetation is a before and after planting concern. Soil condition is degraded due to the lose of the native forest ecosystem (organic matter in top soil depleted). Native wildlife habitat is lacking. The main resource concern is degraded plant condition and inadequate structure and composition

**After Situation:**

40 acres of land is established with permanent tree cover that will improve degraded plant condition, reduce soil erosion, establish wildlife habitat, sequester carbon and reduce invasive species presence. Establishing forest vegetation also creates corridors for wildlife movement.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $9,847.26

**Scenario Cost/Unit:** $246.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 18 | $1,168.56 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Mechanical tree planter | 1600 | Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor. | Hour | $7.01 | 18 | $126.18 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 30 | $852.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 20 | $542.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 20 | $945.00 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, bare root, 1-0 | 1512 | Bare root conifer trees, 1-0 (1 year old). Includes materials and shipping only. | Each | $0.33 | 18000 | $5,940.00 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 100 | $102.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #7 - Conservation, Hand Planting

**Scenario Description:**

Improving a forestry or agroforestry setting by hand planting tree and/or shrub seedlings for conservation purposes other than standard reforestation. A small percentage of shrubs targeted for wildlife purposes may also be included. The number of trees/shrubs to plant may be lower than establishing a new forest, typically 150 trees per acre. The typical tree/shrub planting implementation is after 490 Tree & Shrub Site Preparation and includes a small (up to 1sqft) scalp, tree or shrub planting and travel between planting spots. Resource concerns are degraded plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation.

**Before Situation:**

In an existing upland forest the present trees/shrubs are poor quality, at low stocking levels, or are undesirable species. Existing conditions do not meet landowner objectives of growing high quality trees/shrubs. Wildlife habitat is poor due to the above described conditions. Resource concerns are degrade plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation. Prior to planting any needed vegetation control will be conducted first.

**After Situation:**

The typical area of treatment can run from 1/2 acre to 10 acres. Tree/shrub seedlings are planted by hand in the best locations for seedling survival. Post planting vegetation control is planned to ensure seedling survival.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,653.91

**Scenario Cost/Unit:** $265.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 9 | $192.51 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 17.5 | $216.30 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 21.5 | $610.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 500 | $230.00 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 1000 | $830.00 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 100 | $102.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #8 - Conservation, Hand Planting, Browse protection

**Scenario Description:**

Improving a forestry or agroforestry setting by hand planting tree and/or shrub seedlings for conservation purposes other than standard reforestation. A small percentage of shrubs targeted for wildlife purposes may also be included. Seedlings are protected from deer browsing. The number of trees/shrubs to plant may be lower than establishing a new forest, typically 150 trees per acre. Includes time for small scalp of about 1 sqft per tree at time of planting. Resource concerns are degraded plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation.

**Before Situation:**

In an existing upland forest the present trees are poor quality, at low stocking levels, or are undesirable species. Existing conditions do not meet landowner objectives of growing high quality trees. Wildlife habitat is poor due to the above described conditions. Resource concerns are degrade plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation. Prior to planting any needed vegetation control will be conducted first.

**After Situation:**

The typical area of treatment can run from 1/2 acre to 10 acres. Tree/shrub seedlings are planted by hand in the best locations for seedling survival. Tree tubes are installed to protect seedlings from animal browsing damage. Post planting vegetation control is planned to ensure seedling survival.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $7,176.58

**Scenario Cost/Unit:** $717.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 18 | $385.02 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 28.5 | $352.26 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 34.5 | $979.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 500 | $230.00 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 1000 | $830.00 |
| Tree shelter, solid tube type, 3-1/4" x 30" | 1560 | 3-1/4" x 30" tree tube for protection from animal damage. Materials only. | Each | $1.82 | 1500 | $2,730.00 |
| Stakes, wood, 3/4" x 3/4" x 36" | 1581 | 3/4" x 3/4" x 36" wood stakes to fasten items in place. Includes materials only. | Each | $0.73 | 1500 | $1,095.00 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 100 | $102.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #9 - Conservation, 1 gal pots, Hand planting, Per seedling

**Scenario Description:**

Seedlings (potted) to be planted for conservation purposes other than standard reforestation. Planting will be by hand. The resource setting is an area that historically was an upland forest. Resource concerns are degrade plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife.

**Before Situation:**

The native forest that has been removed and the land is either row cropped, grazed or hayed or brushy forest. If any upland trees exist they are poor quality tree or undesirable species. Terrain is gently to moderately sloping with soil erosion-sheet and rill occurring.

**After Situation:**

The typical area of treatment can range from less than 1 acre to 10 acre; typical scenario based on 1 ac, 300 TPA. Potted (1-gal potted stock) seedlings are planted by hand. Post vegetation growth should be evaluated and controlled as necessary.

**Feature Measure:** Per Seedling planted

**Scenario Unit::** Each

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $2,732.55

**Scenario Cost/Unit:** $9.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 7 | $149.73 |
| Trailer, flatbed, small | 1505 | Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $15.61 | 2 | $31.22 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 15 | $185.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 23 | $653.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.48 | 100 | $448.00 |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.50 | 100 | $450.00 |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.37 | 100 | $437.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #10 - Native Seed, Hand Plant

**Scenario Description:**

Native seed (acorns, nuts, etc.) from native tree species are directly planted in the soil. Site preparation is completed (disking to eliminate competing vegetation) using Practice 490 Tree/Shrub Site Preparation. The native seed are collected/purchased locally so as to get trees known to be adapted to local conditions. Resource concerns are degraded plant condition, inadequate habitat for fish and wildlife.

**Before Situation:**

The forest is degrading or a catastrophic event (fire/flood) has occurred. High value species, lumber and wildlife habitat, are not regenerating due to changes in the natural disturbance regime or past harvesting. Unwanted shade tolerant tree species have regenerated and are in the overstory competing with desirable species as well as in the mid and understory where they will eventually out-compete with desirable species.

**After Situation:**

Seed from native species are collected or purchased and planted at prescribed rates. Degraded plant condition is on an upward trend and habitat for wildlife will improve.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $558.09

**Scenario Cost/Unit:** $558.09

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 4 | $49.44 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 6 | $170.40 |
| **Materials** | | | | | | |
| Trees and shrubs, seed | 1871 | Tree or shrub seed, e.g., acorns, to establish trees. Includes materials and shipping only. | Pound | $4.51 | 75 | $338.25 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #11 - Floodplain Stabilization

**Scenario Description:**

Large woody cuttings and cottonwood or other tree boles along with smaller cuttings/whips are planted on natural floodplain levees designed to capture large and small wood and sediments during overbank event. Trapped sediments then allow for natural regeneration of willows, cottonwood, red alter, and/or other early successional species. Typical treatment size is about 1 acre with a combined total of about 100 6" dia cuttings and tree boles installed. Resource concerns addressed are degraded plant condition - undesirable plant productivity and inadequate structure and composition; degraded water quality - excessive sediments in surface waters; and degraded wildlife habitat.

**Before Situation:**

The floodplain is unstable and the stream/river system is widening and becoming more shallow. Because of the changes in the river/stream and floodplain, the side channels used for spawning, rearing and escape are becoming cut off from use or changing and becoming less useable. There is significant cutting and shifting of the streambanks and exposed soil.

**After Situation:**

Woody cuttings and tree boles are planted and are sprouting into permanent tree cover on small areas, typically 1-2 acres, on floodplain levees. Established trees will improve plant condition, sequester atmospheric carbon and help stabilize streambanks and floodplains. Establishing forest vegetation also creates corridors for wildlife movement and improves fish and wildlife and stream habitat.

**Feature Measure:** Area Treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,964.90

**Scenario Cost/Unit:** $5,964.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 7 | $454.44 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 7 | $170.24 |
| Trailer, flatbed, small | 1505 | Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $15.61 | 5 | $78.05 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 7 | $86.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 18 | $488.16 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 9 | $425.25 |
| **Materials** | | | | | | |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 250 | $120.00 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.74 | 100 | $1,774.00 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #12 - Floodplain Living Tree Fence

**Scenario Description:**

A flood fence of living trees is installed to jump-start riparian succession adjacent to a non-wooded, braided stream system; and may also protect streambank & floodplain from flood debris and scour. Typically a 500-600 foot length of vertically aligned large woody pole cuttings (approx. 6" dia, 20' long) and cottonwood or other tree boles are installed in multiple rows on 8' - 12' spacing. Typically installed using large construction equipment. Resulting tree fence will establish long-term riparian vegetation, add a large wood component to enhance complex edge habitat, and augment natural river processes to encourage riparian succession and sediment accumulation. Habitat created will enhance rearing and migration for salmonid species in adjacent stream habitat. The primary resource concern addressed is Inadequate Habitat for Fish and Wildlife; with additional benefits to Water Quality Degradation-excessive sediments in surface waters & excessive temperature.

**Before Situation:**

The current site is along a non-forested stream or river reach, typically with bank full widths greater than 20 feet wide with cropland or pastureland adjacent. The reach has been modified from its historic channel morphology and lacks the opportunity of natural channel roughness which has contributed to declining salmonid habitat complexity. Stream habitat is simplified with low-value edge complexity.

**After Situation:**

Woody pole cuttings and/or tree boles are planted and are sprouting into dense permanent tree cover in rows adjacent to the stream to create a living tree fence. Over time the tree fence also retains sediments and seed deposited during overbank flow events which establish additional protective vegetation. The fence also captures large woody material on the streambank during overbank flows that contributes to channel and floodplain roughness without damage to adjacent agricultural lands.

**Feature Measure:** Area Treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $22,328.83

**Scenario Cost/Unit:** $22,328.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 20 | $1,298.40 |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 20 | $143.60 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 20 | $427.80 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 20 | $486.40 |
| Trailer, flatbed, small | 1505 | Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $15.61 | 6 | $93.66 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 128 | $3,635.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 45 | $1,220.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 45 | $2,126.25 |
| **Materials** | | | | | | |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.74 | 680 | $12,063.20 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #54 - Conservation, 1 gal pots, Hand planting, Per seedling, Protected

**Scenario Description:**

Seedlings (potted) to be planted for conservation purposes other than standard reforestation. Trees or shrubs are planted and protection is installed. The resource setting typically is a riparian restoration or wildlife areas where individual shrubs and trees are needed, typically using 50-100 seedlings per project. Resource concerns are degrade plant condition - undesirable productivity and health, excessive plant pest pressure, inadequate structure and composition; and inadequate habitat for fish and wildlife. Associated practices: 327-Conservation Cover, 391-Riparian Forest Buffer.

**Before Situation:**

Riparian areas, upland forest, or other barren areas around agricultural areas are in a degraded condition due to overuse, excessive trampling, neglect, or plant pest pressure. Land has little vegetation to provide protection from erosion and provides little or no habitat values.

**After Situation:**

Trees or shrubs are planted and protected, typically using wire fence cage. Practice is often used along with other practices such as 327-Conservation Cover or 391-Riparian Forest Buffer.

**Feature Measure:** Per Seedling planted

**Scenario Unit::** Each

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,116.20

**Scenario Cost/Unit:** $31.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 20 | $247.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Wire, Woven, Galvanized, 12.5 Gauge, 48" | 4 | Galvanized 12.5 gauge, 48" - 330' roll. Includes materials and shipping only. | Each | $261.88 | 3 | $785.64 |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.48 | 50 | $224.00 |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.50 | 50 | $225.00 |
| Stakes, wood, 3/4" x 3/4" x 60" | 1583 | 3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only. | Each | $1.60 | 400 | $640.00 |

**Practice:** 614 - Watering Facility

**Scenario** #1 - Tire Trough

**Scenario Description:**

A permanent watering facility for livestock and/or wildlife constructed from tires that stores adequate quantity and quality of water for storage and/or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and/or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

There is insufficient water to meet livestock or wildlife watering needs at a site. Animals may have access to streams or ponds, need to travel a long distance to available water or pasture use and rotation may be affected. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and/or wildlife where water is not available in sufficient quantities at specific locations; and where habitat, water quality, plant productivity and health needs to be improved. Resource concerns include, but may not be limited to, Plant Condition and Quality, Soil Erosion and Stream Habitat/Water Quality.

**After Situation:**

A permanent watering facility using a 10' diameter tire is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and/or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 981.0

**Scenario Total Cost:** $2,336.87

**Scenario Cost/Unit:** $2.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formless, non reinforced | 36 | Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $138.47 | 0.7 | $96.93 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 6 | $330.18 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 13 | $369.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 7 | $189.84 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $80.05 | 1 | $80.05 |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $25.16 | 1 | $25.16 |
| Tank, Tire, 10' diameter | 287 | Tire, includes material cost for tank and shipping. Labor and other appurtenance costs not included. | Each | $1,010.95 | 1 | $1,010.95 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 24 | $23.04 |
| Post, Wood, CCA Treated, 4-5" X 7' | 1050 | Wood Post, Line 4-5" X 7', CCA Treated. Includes materials and shipping only. | Each | $8.12 | 2 | $16.24 |
| Tank, Float Valve Assembly | 1077 | Float Valve, Stem, Swivel, Float Ball | Each | $24.61 | 1 | $24.61 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 1.7 | $33.39 |

**Practice:** 614 - Watering Facility

**Scenario** #2 - Frost Free Trough

**Scenario Description:**

A permanent watering facility for livestock and/or wildlife using a frost free watering system that stores adequate quantity and quality of water for storage and/or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and/or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

There is insufficient water to meet livestock or wildlife watering needs at a site. Animals may have access to streams or ponds, need to travel a long distance to available water or pasture use and rotation may be affected. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and/or wildlife; where water is not available in sufficient quantities at specific locations; and where habitat, water quality, plant productivity and health needs to be improved. Resource concerns include, but may not be limited to, Plant Condition and Quality, Soil Erosion and Stream Habitat/Water Quality.

**After Situation:**

A permanent watering facility including a 4-hole frost free waterer is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 70.0

**Scenario Total Cost:** $2,479.94

**Scenario Cost/Unit:** $35.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 0.27 | $75.86 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 4 | $220.12 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 34 | $965.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 5 | $135.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Tank, Freeze Proof, 4 hole | 281 | Tank, Freeze Proof with 4 drinking holes. Includes materials and shipping. | Each | $939.00 | 1 | $939.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 0.33 | $6.48 |

**Practice:** 614 - Watering Facility

**Scenario** #3 - Above Ground Storage Tank

**Scenario Description:**

A permanent above ground storage facility to provide water for a watering facility for livestock and/or wildlife. All water storage facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and/or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

There is insufficient water to meet livestock or wildlife watering needs at a site. Animals may have access to streams or ponds, need to travel a long distance to available water or pasture use and rotation may be affected. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and/or wildlife where water is not available in sufficient quantities at specific locations; and where habitat, water quality, plant productivity and health needs to be improved. Resource concerns include, but may not be limited to, Plant Condition and Quality, Soil Erosion and Stream Habitat/Water Quality.

**After Situation:**

A permanent water storage facility using an above ground poly tank is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock, wildlife or other conservation practices for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All water storage facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 3,000.0

**Scenario Total Cost:** $5,017.37

**Scenario Cost/Unit:** $1.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 1.8 | $786.58 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 10 | $25.50 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 4 | $220.12 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 26 | $738.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 5 | $135.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Tank, Poly Enclosed Storage, >1,000 | 1075 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.97 | 3000 | $2,910.00 |
| Tank, Float Valve Assembly | 1077 | Float Valve, Stem, Swivel, Float Ball | Each | $24.61 | 1 | $24.61 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 2 | $39.28 |

**Practice:** 614 - Watering Facility

**Scenario** #4 - Below Ground Storage Tank

**Scenario Description:**

A permanent below-ground storage facility to provide water for a watering facility for livestock and/or wildlife. All water storage facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

There is insufficient water to meet livestock or wildlife watering needs at a site. Animals may have access to streams or ponds, need to travel a long distance to available water or pasture use and rotation may be affected. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and/or wildlife; where water is not available in sufficient quantities at specific locations; and where habitat, water quality, plant productivity and health needs to be improved. Resource concerns include, but may not be limited to, Plant Condition and Quality, Soil Erosion and Stream Habitat/Water Quality.

**After Situation:**

A permanent water storage facility using a below-ground concrete tank is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock, wildlife or other conservation practices for storage and/or direct drinking access and provides improved plant productivity and health, water quality, and habitat. Typical scenario is for a 8.4' inner length and width square tank with 10" thick walls, 10' outer dimension. All water storage facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $7,109.09

**Scenario Cost/Unit:** $2.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 8 | $519.36 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 8 | $1,291.52 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 18 | $511.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 18 | $722.88 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Tank, Concrete, 2500 gallon | 1055 | Concrete tank for water storage, with riser and lid. Includes materials and delivery. | Each | $3,269.88 | 1 | $3,269.88 |
| Tank, Float Valve Assembly | 1077 | Float Valve, Stem, Swivel, Float Ball | Each | $24.61 | 1 | $24.61 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 2 | $39.28 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 614 - Watering Facility

**Scenario** #5 - Stock Trough, 300 gal or less

**Scenario Description:**

A permanent watering facility for livestock and/or wildlife constructed of approved materials with 300 gallons or less of capacity that stores adequate quantity and quality of water for storage and/or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and/or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

There is insufficient water to meet livestock or wildlife watering needs at a site. Animals may have access to streams or ponds, need to travel a long distance to available water or pasture use and rotation may be affected. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and/or wildlife; water is not available in sufficient quantities at specific locations; and where habitat, water quality, plant productivity and health needs to be improved. Resource concerns include, but may not be limited to, Plant Condition and Quality, Soil Erosion and Stream Habitat/Water Quality.

**After Situation:**

A permanent watering facility with a capacity of 300 gallons or less is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and/or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 275.0

**Scenario Total Cost:** $1,881.69

**Scenario Cost/Unit:** $6.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 4 | $220.12 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 5 | $200.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $80.05 | 1 | $80.05 |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $25.16 | 1 | $25.16 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 24 | $23.04 |
| Post, Wood, CCA Treated, 4-5" X 7' | 1050 | Wood Post, Line 4-5" X 7', CCA Treated. Includes materials and shipping only. | Each | $8.12 | 5 | $40.60 |
| Tank, Galvanized Steel Livestock, >75 - 300 gallon | 1067 | Includes tank materials and float valve | Gallon | $1.31 | 275 | $360.25 |
| Tank, Float Valve Assembly | 1077 | Float Valve, Stem, Swivel, Float Ball | Each | $24.61 | 1 | $24.61 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 0.5 | $9.82 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 614 - Watering Facility

**Scenario** #6 - Stock Trough, >300 to 600 gal

**Scenario Description:**

A permanent watering facility for livestock and/or wildlife constructed of approved materials with >300 to 600 gallons of capacity that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and/or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

There is insufficient water to meet livestock or wildlife watering needs at a site. Animals may have access to streams or ponds, need to travel a long distance to available water or pasture use and rotation may be affected. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and/or wildlife; where water is not available in sufficient quantities at specific locations; and where habitat, water quality, plant productivity and health needs to be improved. Resource concerns include, but may not be limited to, Plant Condition and Quality, Soil Erosion and Stream Habitat/Water Quality.

**After Situation:**

A permanent watering facility with a capacity of >300 to 600 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and/or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 400.0

**Scenario Total Cost:** $1,769.53

**Scenario Cost/Unit:** $4.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 4 | $220.12 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 5 | $200.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $80.05 | 1 | $80.05 |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $25.16 | 1 | $25.16 |
| Tank, Galvanized, 400 gallon | 279 | Tank Galvanized - 400 gallon capacity | Each | $240.41 | 1 | $240.41 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 32 | $30.72 |
| Post, Wood, CCA Treated, 4-5" X 7' | 1050 | Wood Post, Line 4-5" X 7', CCA Treated. Includes materials and shipping only. | Each | $8.12 | 5 | $40.60 |
| Tank, Float Valve Assembly | 1077 | Float Valve, Stem, Swivel, Float Ball | Each | $24.61 | 1 | $24.61 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 0.5 | $9.82 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 614 - Watering Facility

**Scenario** #7 - Stock Trough, >600 gal

**Scenario Description:**

A permanent watering facility for livestock and/or wildlife constructed of approved materials with >600 gallons of capacity that stores adequate quantity and quality of water for storage and/or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and/or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

There is insufficient water to meet livestock or wildlife watering needs at a site. Animals may have access to streams or ponds, need to travel a long distance to available water or pasture use and rotation may be affected. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and/or wildlife; where water is not available in sufficient quantities at specific locations; and where habitat, water quality, plant productivity and health needs to be improved. Resource concerns include, but may not be limited to, Plant Condition and Quality, Soil Erosion and Stream Habitat/Water Quality.

**After Situation:**

A permanent watering facility with a capacity of >600 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and/or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 718.0

**Scenario Total Cost:** $2,018.30

**Scenario Cost/Unit:** $2.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 4 | $220.12 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 5 | $200.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $80.05 | 1 | $80.05 |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $25.16 | 1 | $25.16 |
| Post, Wood, CCA Treated, 4-5" X 7' | 1050 | Wood Post, Line 4-5" X 7', CCA Treated. Includes materials and shipping only. | Each | $8.12 | 5 | $40.60 |
| Tank, Galvanized Steel Livestock, > 300 - 1,000 gallon | 1068 | Includes tank materials and float valve | Gallon | $0.77 | 718 | $552.86 |
| Tank, Float Valve Assembly | 1077 | Float Valve, Stem, Swivel, Float Ball | Each | $24.61 | 1 | $24.61 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 1 | $19.64 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 614 - Watering Facility

**Scenario** #8 - Remote Stock Trough

**Scenario Description:**

A permanent watering facility for livestock and/or wildlife located in a remote area constructed of approved materials that stores adequate quantity and quality of water for storage and/or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and/or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

There is insufficient water to meet livestock or wildlife watering needs at a site. Animals may have access to streams or ponds, need to travel a long distance to available water or pasture use and rotation may be affected. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and/or wildlife; where water is not available in sufficient quantities at specific locations; and where habitat, water quality, plant productivity and health needs to be improved. Resource concerns include, but may not be limited to, Plant Condition and Quality, Soil Erosion and Stream Habitat/Water Quality.

**After Situation:**

A permanent watering facility with typical capacity of 500 gallons is installed in a remote location with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and/or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $3,145.94

**Scenario Cost/Unit:** $6.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 12 | $779.04 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 12 | $481.92 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 12 | $567.00 |
| **Materials** | | | | | | |
| Tank, Poly Livestock, >300 - 1,000 gallon | 1065 | Includes tank materials and float valve | Gallon | $0.73 | 500 | $365.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 614 - Watering Facility

**Scenario** #9 - Bottomless Steel Tank w/o Liner

**Scenario Description:**

A permanent water storage tank for a watering facility is constructed using a bottomless steel tank with a concrete bottom, without a liner. Facility stores adequate quantity and quality of water for storage and/or direct drinking access used for livestock, wildlife, or other conservation practices. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, water quantity, and undesirable plant productivity and health.

**Before Situation:**

There is insufficient water to meet livestock or wildlife watering needs at a site. Animals may have access to streams or ponds, need to travel a long distance to available water or pasture use and rotation may be affected. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and/or wildlife; where water is not available in sufficient quantities at specific locations; and where habitat, water quality, plant productivity and health needs to be improved. Resource concerns include, but may not be limited to, Plant Condition and Quality, Soil Erosion and Stream Habitat/Water Quality.

**After Situation:**

A permanent watering facility constructed using a bottomless steel tank without a liner, and a concrete bottom is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock, wildlife or other conservation practices for storage and/or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $4,316.86

**Scenario Cost/Unit:** $1.73

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 4.7 | $1,320.56 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 4 | $220.12 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 36 | $1,022.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $80.05 | 1 | $80.05 |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $25.16 | 1 | $25.16 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 48 | $46.08 |
| Post, Wood, CCA Treated, 4-5" X 7' | 1050 | Wood Post, Line 4-5" X 7', CCA Treated. Includes materials and shipping only. | Each | $8.12 | 3 | $24.36 |
| Tank, Galvanized Steel Bottomless Livestock, <= 6,000 gallon | 1069 | Includes tank materials, shipping, and float valve, no liner | Gallon | $0.29 | 2500 | $725.00 |
| Tank, Float Valve Assembly | 1077 | Float Valve, Stem, Swivel, Float Ball | Each | $24.61 | 1 | $24.61 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 4.7 | $92.31 |

**Mobilization**

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 614 - Watering Facility

**Scenario** #10 - Bottomless Steel Tank with liner

**Scenario Description:**

A permanent water storage tank for a watering facility is constructed using a bottomless steel tank with a liner. Facility stores adequate quantity and quality of water for storage and/or direct drinking access used for livestock, wildlife, or other conservation practices. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, water quantity, and undesirable plant productivity and health.

**Before Situation:**

Water is not available in sufficient quantity or at the required times to provide for wildlife or livestock watering or for other conservation practices. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock, wildlife and or other conservation practices; where water is not available in sufficient quantities at specific locations; and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

A permanent watering facility constructed using a bottomless steel tank with a liner is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock, wildlife, or other conservation practices for storage and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 12,000.0

**Scenario Total Cost:** $20,141.07

**Scenario Cost/Unit:** $1.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 132 | $3,748.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 9 | $361.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 2.8 | $78.71 |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $80.05 | 1 | $80.05 |
| Tank, Galvanized Steel Bottomless w/liner Livestock, > 6,000 gallon | 1072 | Includes tank materials, shipping, and float valve, no liner | Gallon | $1.20 | 12000 | $14,400.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 4.7 | $92.31 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 620 - Underground Outlet

**Scenario** #1 - Rock-lined Catch Basin with outlet pipe <=6 inch

**Scenario Description:**

Installation of a rock-lined catch basin and outlet pipe with a pipe diameter of 6" or less. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical scenario is for installation of 200 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated 52" deep and 24" wide by hydraulic track excavator. Costs include 6" SDR-35 pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $2,501.12

**Scenario Cost/Unit:** $12.51

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 67 | $163.48 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 67 | $109.88 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 1 | $2.10 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 1.6 | $44.98 |
| Pipe, PVC, 6", SDR 35 | 993 | Materials: - 6" - PVC - SDR 35 - ASTM D3034 | Foot | $4.65 | 200 | $930.00 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $588.77 | 1 | $588.77 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #2 - Rock-lined Catch Basin with outlet pipe <=6 inch, Complex Install

**Scenario Description:**

Installation of a rock-lined catch basin and outlet pipe 6" in diameter or less in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation). This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical scenario is for installation of 200 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated 52" deep and 24" wide by hydraulic track excavator in rocky soils. Costs include 6" SDR-35 pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $2,719.54

**Scenario Cost/Unit:** $13.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 67 | $328.30 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 67 | $163.48 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 1 | $2.10 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 1.6 | $44.98 |
| Pipe, PVC, 6", SDR 35 | 993 | Materials: - 6" - PVC - SDR 35 - ASTM D3034 | Foot | $4.65 | 200 | $930.00 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $588.77 | 1 | $588.77 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #3 - Outlet Pipe <=6 inch

**Scenario Description:**

Installation of an outlet line with a diameter of 6" or less to convey stormwater from one location to a suitable and stable outlet. This practice is often installed in conjunction with roof runoff structures, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical scenario is for installation of 500 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated 52" deep and 24" wide by hydraulic track excavator. Costs include 6" PVC pipe trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $3,797.15

**Scenario Cost/Unit:** $7.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 170 | $414.80 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 170 | $278.80 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 4 | $112.44 |
| Pipe, PVC, 6", SDR 35 | 993 | Materials: - 6" - PVC - SDR 35 - ASTM D3034 | Foot | $4.65 | 500 | $2,325.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #4 - Outlet Pipe <=6 inch, Complex Install

**Scenario Description:**

Installation of an outlet line with a diameter of 6" or less in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation) to convey stormwater from one location to a suitable and stable outlet. This practice is often installed in conjunction with roof runoff structures, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical scenario is for installation of 500 feet of 6" approved plastic pipe in soils requiring rock ripping to convey stormwater from one location to a suitable and stable outlet. Trench is excavated 52" deep and 24" wide by hydraulic track excavator. Costs include 6" PVC pipe trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $4,351.35

**Scenario Cost/Unit:** $8.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 170 | $833.00 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 170 | $414.80 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 4 | $112.44 |
| Pipe, PVC, 6", SDR 35 | 993 | Materials: - 6" - PVC - SDR 35 - ASTM D3034 | Foot | $4.65 | 500 | $2,325.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #5 - Outlet Pipe <=6 inch, Imported Fill

**Scenario Description:**

Installation of an outlet line with a diameter of 6" or less to convey stormwater from one location to a suitable and stable outlet on a site where fill is required to cover the pipe (for example when installing pipe and fill to cover an open ditch). This practice is often installed in conjunction with roof runoff structures, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical scenario is for installation of 500 feet of 6" approved plastic pipe to cover an open ditch and convey stormwater from one location to a suitable and stable outlet. Assume average ditch dimensions are 52" deep and 24" wide. Costs include grading of ditch, pipe installation, ditch backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $7,561.70

**Scenario Cost/Unit:** $15.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 170 | $392.70 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 10 | $649.20 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 8 | $893.28 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 170 | $414.80 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 18 | $722.88 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 4 | $112.44 |
| Pipe, PVC, 6", SDR 35 | 993 | Materials: - 6" - PVC - SDR 35 - ASTM D3034 | Foot | $4.65 | 500 | $2,325.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 620 - Underground Outlet

**Scenario** #6 - Rock-lined Catch Basin with outlet pipe >6-12 inch

**Scenario Description:**

Installation of a rock-lined catch basin and outlet pipe with a pipe >6" to 12". This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical scenario is for the installation of a 2'x2'x6' concrete catch basin and 200 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $3,040.44

**Scenario Cost/Unit:** $15.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 84 | $204.96 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 84 | $137.76 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 1 | $2.10 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 4 | $112.44 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 10" | 1243 | Pipe, Corrugated HDPE Double Wall, 10" diameter with soil tight joints - AASHTO M252. Material cost only. | Foot | $6.19 | 200 | $1,238.00 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $588.77 | 1 | $588.77 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #7 - Rock-lined Catch Basin with outlet pipe >6-12 inch, Complex Install

**Scenario Description:**

Installation of a rock-lined catch basin and outlet pipe with a pipe >6" to 12" in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation).This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606).

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical scenario is for the installation of a 2'x2'x6' catch basin and 200 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation). Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation in rocky soils, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $3,314.28

**Scenario Cost/Unit:** $16.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 84 | $411.60 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 84 | $204.96 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 1 | $2.10 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 4 | $112.44 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 10" | 1243 | Pipe, Corrugated HDPE Double Wall, 10" diameter with soil tight joints - AASHTO M252. Material cost only. | Foot | $6.19 | 200 | $1,238.00 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $588.77 | 1 | $588.77 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #8 - Outlet Pipe >6-12 inch

**Scenario Description:**

Installation of an outlet line with a diameter of >6" to 12" to convey stormwater from one location to a suitable and stable outlet. This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical scenario is for the installation of 500 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, trench excavation in rocky soils, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $4,979.46

**Scenario Cost/Unit:** $9.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 210 | $512.40 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 210 | $344.40 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 9.5 | $267.05 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 10" | 1243 | Pipe, Corrugated HDPE Double Wall, 10" diameter with soil tight joints - AASHTO M252. Material cost only. | Foot | $6.19 | 500 | $3,095.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #9 - Outlet Pipe >6-12 inch, Complex Install

**Scenario Description:**

Installation of an outlet line with a diameter of >6" to 12" in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation) to convey stormwater from one location to a suitable and stable outlet. This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical scenario is for the installation of 500 feet of 10" approved plastic pipe in an area requiring rock ripping. Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, trench excavation in rocky soils, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $5,664.06

**Scenario Cost/Unit:** $11.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 210 | $1,029.00 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 210 | $512.40 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 9.5 | $267.05 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 10" | 1243 | Pipe, Corrugated HDPE Double Wall, 10" diameter with soil tight joints - AASHTO M252. Material cost only. | Foot | $6.19 | 500 | $3,095.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #10 - Outlet Pipe >6-12 inch, Imported Fill

**Scenario Description:**

Installation of an outlet line with a diameter of >6" to 12" to convey stormwater from one location to a suitable and stable outlet on a site where fill is required to cover the pipe (for example when installing pipe and fill to cover an open ditch). This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical scenario is for the installation of 500 feet of 10" approved plastic pipe to cover an open ditch and convey stormwater from one location to a suitable and stable outlet. Assume average ditch dimensions are 58" deep and 28"wide. Costs include grading of ditch, pipe installation, ditch backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $8,770.81

**Scenario Cost/Unit:** $17.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 210 | $485.10 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 10 | $649.20 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 8 | $893.28 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 210 | $512.40 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 18 | $722.88 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 9.5 | $267.05 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 10" | 1243 | Pipe, Corrugated HDPE Double Wall, 10" diameter with soil tight joints - AASHTO M252. Material cost only. | Foot | $6.19 | 500 | $3,095.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 620 - Underground Outlet

**Scenario** #11 - Rock-lined Catch Basin with outlet pipe >12-18 inch

**Scenario Description:**

Installation of a rock-lined catch basin and outlet pipe with a pipe >12" to 18". This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical installation is for 200 feet of 18" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 66" deep x 39" wide. Costs include 18" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $5,203.70

**Scenario Cost/Unit:** $26.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 132 | $322.08 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 132 | $216.48 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 24 | $683.76 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 18" | 1245 | Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $13.16 | 200 | $2,632.00 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $588.77 | 1 | $588.77 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #12 - Rock-lined Catch Basin with outlet pipe >12-18 inch, Complex Install

**Scenario Description:**

Installation of a rock-lined catch basin and outlet pipe with a pipe >12" to 18" in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation). This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical installation is for 200 feet of 18" approved plastic pipe in a site requiring rock ripping to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 66" deep x 39" wide. Costs include 18" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $5,634.02

**Scenario Cost/Unit:** $28.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 132 | $646.80 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 132 | $322.08 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 24 | $683.76 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 18" | 1245 | Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $13.16 | 200 | $2,632.00 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $588.77 | 1 | $588.77 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #13 - Outlet Pipe >12-18 inch

**Scenario Description:**

Installation of an outlet line with a diameter of >12" to 18" to convey stormwater from one location to a suitable and stable outlet. This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical install is for 500 feet of 18" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 66" deep x 39" wide. Costs include 18" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $10,396.41

**Scenario Cost/Unit:** $20.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 330 | $805.20 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 330 | $541.20 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 60 | $1,709.40 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 18" | 1245 | Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $13.16 | 500 | $6,580.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #14 - Outlet Pipe >12-18 inch, Complex Install

**Scenario Description:**

Installation of an outlet line with a diameter of >12" to 18" in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation) to convey stormwater from one location to a suitable and stable outlet. This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical install is for 500 feet of 18" approved plastic pipe and excavation requiring rock ripping to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 66" deep x 39" wide. Costs include 18" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $11,472.21

**Scenario Cost/Unit:** $22.94

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 330 | $1,617.00 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 330 | $805.20 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 60 | $1,709.40 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 18" | 1245 | Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $13.16 | 500 | $6,580.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #15 - Outlet Pipe >12-18 inch, Imported Fill

**Scenario Description:**

Installation of an outlet line with a diameter of >12" to 18" to convey stormwater from one location to a suitable and stable outlet on a site where fill is required to cover the pipe (for example when installing pipe and fill to cover an open ditch). This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical install is for 500 feet of 18" approved plastic pipe to cover an open ditch and convey stormwater from one location to a suitable and stable outlet. Assume average ditch dimensions are 66" deep x 39". Costs include grading of ditch, pipe installation, ditch backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $14,173.66

**Scenario Cost/Unit:** $28.35

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 330 | $762.30 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 10 | $649.20 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 8 | $893.28 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 330 | $805.20 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 18 | $722.88 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 60 | $1,709.40 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 18" | 1245 | Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $13.16 | 500 | $6,580.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 620 - Underground Outlet

**Scenario** #16 - Rock-lined Catch Basin with outlet pipe >18-24 inch

**Scenario Description:**

Installation of a rock-lined catch basin and outlet pipe with a pipe >18" to 24". This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical installation is for a 4'x4' manhole and 200' of 24" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 72" x 48" wide. Costs include 24" HDPE pipe, Precast concrete drop inlet with steel grate, 24" HDPE pipe, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $7,531.03

**Scenario Cost/Unit:** $37.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 132 | $322.08 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 132 | $216.48 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 24 | $683.76 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 24" | 1246 | Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $23.87 | 200 | $4,774.00 |
| Catch Basin, concrete, 3'x3'x6' | 1258 | Catch Basin, Precast Concrete, 3' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $774.10 | 1 | $774.10 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #17 - Rock-lined Catch Basin with outlet pipe >18-24 inch, Complex Install

**Scenario Description:**

Installation of a rock-lined catch basin and outlet pipe with a pipe >18" to 24" in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation). This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical installation is for a 4'x4' manhole and 200' of 24" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 72" x 48" wide, all excavation is assumed to be rock ripping. Costs include 24" HDPE pipe, Precast concrete drop inlet with steel grate, 24" HDPE pipe, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $7,961.35

**Scenario Cost/Unit:** $39.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 132 | $646.80 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 132 | $322.08 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 24 | $683.76 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 24" | 1246 | Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $23.87 | 200 | $4,774.00 |
| Catch Basin, concrete, 3'x3'x6' | 1258 | Catch Basin, Precast Concrete, 3' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $774.10 | 1 | $774.10 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #18 - Outlet Pipe >18-24 inch

**Scenario Description:**

Installation of an outlet line with a diameter of >18" to 24" to convey stormwater from one location to a suitable and stable outlet. This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Install 500 feet of 24" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 72" x 48" wide. Costs include 24" HDPE pipe, 24" HDPE pipe, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $16,932.86

**Scenario Cost/Unit:** $33.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 445 | $1,085.80 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 445 | $729.80 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 85 | $2,421.65 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 24" | 1246 | Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $23.87 | 500 | $11,935.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #19 - Outlet Pipe >18-24 inch, Complex Install

**Scenario Description:**

Installation of an outlet line with a diameter of >18" to 24" in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation) to convey stormwater from one location to a suitable and stable outlet. This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Install 500 feet of 24" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 72" x 48" wide, all excavation is assumed to be rock ripping. Costs include 24" HDPE pipe, 24" HDPE pipe, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $18,383.56

**Scenario Cost/Unit:** $36.77

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 445 | $2,180.50 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 445 | $1,085.80 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 85 | $2,421.65 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 24" | 1246 | Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $23.87 | 500 | $11,935.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #20 - Outlet Pipe >18-24 inch, Imported fill

**Scenario Description:**

Installation of an outlet line with a diameter of >18" to 24" to convey stormwater from one location to a suitable and stable outlet on a site where fill is required to cover the pipe (for example when installing pipe and fill to cover an open ditch). This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Install 500 feet of 24" approved plastic pipe to cover an open ditch and convey stormwater from one location to a suitable and stable outlet. Assume average ditch dimensions are 6'wide x 4' deep. Costs include grading of ditch, pipe installation, ditch backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $20,881.66

**Scenario Cost/Unit:** $41.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 445 | $1,027.95 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 10 | $649.20 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 8 | $893.28 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 445 | $1,085.80 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 18 | $722.88 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 85 | $2,421.65 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 24" | 1246 | Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $23.87 | 500 | $11,935.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 620 - Underground Outlet

**Scenario** #21 - Catch Basin with outlet pipe >24-30 inch

**Scenario Description:**

Installation of a concrete catch basin and outlet pipe with a pipe >24" to 30". This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical installation is for a 3' x 3' x 6' catch basin with 200' of 30" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 78" deep x 56" wide. Costs include 30" HDPE pipe, precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $9,813.37

**Scenario Cost/Unit:** $49.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 226 | $551.44 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 226 | $370.64 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 42 | $1,196.58 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 30" | 1247 | Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $30.80 | 200 | $6,160.00 |
| Catch Basin, concrete, 3'x3'x6' | 1258 | Catch Basin, Precast Concrete, 3' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $774.10 | 1 | $774.10 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #22 - Catch Basin with outlet pipe >24-30 inch, Complex Install

**Scenario Description:**

Installation of a concrete catch basin and outlet pipe with a pipe >24" to 30" in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation).. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical installation is for a 4"x4" manhole with 200' of 30" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 78" deep x 56" wide, all excavation is assumed to be rock ripping. Costs include 30" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $10,550.13

**Scenario Cost/Unit:** $52.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 226 | $1,107.40 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 226 | $551.44 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 42 | $1,196.58 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 30" | 1247 | Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $30.80 | 200 | $6,160.00 |
| Catch Basin, concrete, 3'x3'x6' | 1258 | Catch Basin, Precast Concrete, 3' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $774.10 | 1 | $774.10 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #23 - Outlet Pipe >24-30 inch

**Scenario Description:**

Installation of an outlet line with a diameter of >24" to 30" to convey stormwater from one location to a suitable and stable outlet. This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical installation is 500 feet of 30" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 78" deep x 56" wide. Costs include 30" HDPE pipe, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $21,457.26

**Scenario Cost/Unit:** $42.91

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 565 | $1,378.60 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 565 | $926.60 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 105 | $2,991.45 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 30" | 1247 | Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $30.80 | 500 | $15,400.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #24 - Outlet Pipe >24-30 inch, complex installation

**Scenario Description:**

Installation of an outlet line with a diameter of >24" to 30" in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation) to convey stormwater from one location to a suitable and stable outlet. This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical installation is 500 feet of 30" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 78" deep x 56" wide. Costs include 30" HDPE pipe, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $23,299.16

**Scenario Cost/Unit:** $46.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 565 | $2,768.50 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 565 | $1,378.60 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 105 | $2,991.45 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 30" | 1247 | Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $30.80 | 500 | $15,400.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 620 - Underground Outlet

**Scenario** #25 - Catch Basin with outlet pipe >30-70 inch

**Scenario Description:**

Installation of a concrete catch basin and outlet pipe with a pipe >30" - 70". This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical installation is for a 4'x4' 200 feet of 36" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 84" deep x 64" wide. Costs include 36" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $14,902.71

**Scenario Cost/Unit:** $74.51

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 460 | $1,122.40 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 460 | $754.40 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 90 | $2,564.10 |
| Manhole, 4' x 4' | 1053 | Precast Manhole with base and top delivered. 4' diameter x 4' depth. Materials only. | Each | $1,781.20 | 1 | $1,781.20 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 36" | 1248 | Pipe, Corrugated HDPE Double Wall, 36" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $39.60 | 200 | $7,920.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #26 - Catch Basin with outlet pipe >30-70 inch, Complex Install

**Scenario Description:**

Installation of a concrete catch basin and outlet pipe with a pipe >30" - 70" in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation). This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical installation is for a 4'x4' 200 feet of 36" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 84" deep x 64" wide. Costs include 36" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $16,402.31

**Scenario Cost/Unit:** $82.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 460 | $2,254.00 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 460 | $1,122.40 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 1 | $68.83 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 90 | $2,564.10 |
| Manhole, 4' x 4' | 1053 | Precast Manhole with base and top delivered. 4' diameter x 4' depth. Materials only. | Each | $1,781.20 | 1 | $1,781.20 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 36" | 1248 | Pipe, Corrugated HDPE Double Wall, 36" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $39.60 | 200 | $7,920.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** 620 - Underground Outlet

**Scenario** #27 - Outlet Pipe >30 inch

**Scenario Description:**

Installation of an outlet line with a diameter of >30" to convey stormwater from one location to a suitable and stable outlet. This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical installation is for 500 feet of 36" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 84" deep x 64" wide. Costs include 36" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $32,627.52

**Scenario Cost/Unit:** $65.26

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 690 | $1,683.60 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 690 | $1,131.60 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 135 | $9,292.05 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 1 | $28.49 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 36" | 1248 | Pipe, Corrugated HDPE Double Wall, 36" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $39.60 | 500 | $19,800.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #28 - Outlet Pipe >30 inch, Complex Install

**Scenario Description:**

Installation of an outlet line with a diameter of >30" in complex sites (such as sites with rocky soils or sites requiring special features in the design such as steel encasement of the pipe or cutting of concrete for installation) to convey stormwater from one location to a suitable and stable outlet. This practice is often installed in conjunction with roof runoff management, terraces, diversions, sediment control basins, waterways or similar practices. Associated practices are Roof Runoff Structure (558), Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Typical installation is for 500 feet of 36" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 84" deep x 64" wide, all excavation is assumed to be rock ripping. Costs include 36" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $34,324.92

**Scenario Cost/Unit:** $68.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.90 | 690 | $3,381.00 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 690 | $1,131.60 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 135 | $9,292.05 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 1 | $28.49 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 36" | 1248 | Pipe, Corrugated HDPE Double Wall, 36" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $39.60 | 500 | $19,800.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 620 - Underground Outlet

**Scenario** #29 - Catch Basin and outlet pipe >70 inch

**Scenario Description:**

Installation of a concrete catch basin and outlet pipe with a pipe >70". This practice is often installed in conjunction with diversions, sediment basins or drainage ways serving large (square miles) drainage areas. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Install 500 feet of 72" reinforce concrete pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 9' deep x 8' wide and 1:1 ss. Costs include 72" concrete pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, and laid up stone headwall at outlet.

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $169,155.82

**Scenario Cost/Unit:** $338.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 9 | $3,932.91 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 2300 | $5,612.00 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.64 | 2850 | $4,674.00 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.10 | 2 | $4.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 700 | $19,880.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 60 | $2,835.00 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 6 | $412.98 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 135 | $3,846.15 |
| Pipe, concrete, gravity, 72" diameter | 2197 | 72" diameter low head stormwater concrete pipe. Materials only. | Foot | $254.92 | 500 | $127,460.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 629 - Waste Treatment

**Scenario** #8 - Wastewater Treatment System -High Levels

**Scenario Description:**

This practice scenario represents a treatment system that addresses the disinfection of wastewater at the highest log kill rate, typically 3 log kill. The system includes installation of reverse osmosis, heat application or equivalent system that treats the wastewater runoff from an agricultural operation, typically a flower and plant nursery which covers about 5 acres. The purpose of the practice is to address resource concerns related to water quality degradation due to pathogens. Associated practices: 533-Pumping Plant; 447-Irrigation System, Tailwater Recovery

**Before Situation:**

Nursery waste water currently outlets in an untreated manner which presents potential soil, and water quality concerns.

**After Situation:**

This scenario allows the producer to collect wastewater from a nursery before it affects water quality. One 5,000 tank is used to store irrigation runoff prior to treatment and one 5,000 gallon tank is used to store the post treated water until it is ready to be used again. The typical treatment device includes a series of tanks with membranes that treat the water, or heating units which treat the water with heat. This treatment device will be installed using Associated Practice 533-Pumping Plant, Scenario "Elec<3 HP(Press Tank)". Combined with the associated practices, wastewater is collected, treated, and returned to the irrigation system for use.

**Feature Measure:** Typical Size

**Scenario Unit::** Gallon per Minute

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $37,457.15

**Scenario Cost/Unit:** $749.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 7.4 | $2,079.18 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| **Materials** | | | | | | |
| Tank, Poly Enclosed Storage, >1,000 | 1075 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.97 | 10000 | $9,700.00 |
| Switches and Controls, Wi-Fi system and software | 1194 | Software with built-in cellular or Wi-Fi communication commonly used to control pumps and irrigation systems | Each | $457.13 | 1 | $457.13 |
| Micro Irrigation, Media Filter, 30" to 48" Dia. tank, Equipped for Automatic Flush | 1482 | Sand or media filter for Micro irrigation system. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $5,347.77 | 4 | $21,391.08 |
| Filter, effluent, municipal grade | 2063 | Effluent filter rated 8,000 to 10,000 gallons per day with 1/16" to 1/32" filtration. Includes materials and shipping only. | Each | $377.12 | 3 | $1,131.36 |

**Practice:** 630 - Vertical Drain

**Scenario** #2 - Drywell

**Scenario Description:**

A gravel filled dry well trench to allow for runoff waters from roofs or other impermeable areas to infiltrate into substrata layers. Dry well is in a site with porous, underground strata into which drainage water can be discharged without contaminating groundwater resources by providing an outlet for drainage water from a surface or subsurface drainage system. Resource concerns addressed include soil erosion and surface water quality. Associated practices are Underground Outlet-620 and Roof Runoff Management-558.

**Before Situation:**

This practice is applicable in locations where the underlying strata can receive, transmit or store the design drainage flow, and other drainage outlets are not available and cannot be provided at a reasonable cost. Example situations for the Pacific Region include: 1. Roof drainage goes onto slab areas where it is contaminated with manure, outlets to unstable areas and causes erosion, or outlets directly into waterways reducing ground water recharge. There is no stable outlet or means to enhance infiltration into ground water. 2. Rainfall runoff from impervious areas, such as residential homes and driveways, is unnaturally increased causing erosion and sedimentation in downstream waters.

**After Situation:**

A drywell increases infiltration into ground water and provides a stable infiltration area. Typical scenario is for excavation of a 100' long trench 3'x4', lining 3 sides with geotextile and installation of 4" perforated pipe and gravel.

**Feature Measure:** Length of Trench

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,454.86

**Scenario Cost/Unit:** $24.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 45 | $103.95 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 9 | $255.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 45 | $1,282.05 |
| Geotextile, non-woven, heavy weight | 1210 | Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $4.41 | 117 | $515.97 |
| Pipe, HDPE, 4", PCPT, Single Wall | 1270 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only. | Foot | $0.48 | 100 | $48.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 632 - Waste Separation Facility

**Scenario** #1 - Separator, Vibratory or Rotating Screen

**Scenario Description:**

A small rotating or vibratory screen mechanical separation facility to partition solids, liquids, and/or associated nutrients from animal waste streams. The partitioning of the previously mentioned components facilitates the protection of air and water quality, protects animal health, and improves the management of an animal waste management system. The scenario included the stand, a wall to mount the stand on, the separator and installation of the separator. This scenario does not include a pump or transfer pipeline. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Transfer (634), Amendments for the Treatment of Agricultural Waste (591), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

**Before Situation:**

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

**After Situation:**

One small rotating or vibratory screen type separation facility installed at livestock facility before storage or treatment or after treatment, for example, after an anaerobic digester. Part of an animal waste management system.

**Feature Measure:** Item

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $36,064.33

**Scenario Cost/Unit:** $36,064.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 10 | $2,809.70 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Vibratory or Rotating Screen | 1948 | Vibratory or Rotating Screen, includes materials, shipping and equipment. | Each | $30,886.95 | 1 | $30,886.95 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 632 - Waste Separation Facility

**Scenario** #2 - Separator, Screw or Roller Press

**Scenario Description:**

A small screw or roller press mechanical separation facility to partition solids, liquids, and/or associated nutrients from animal waste streams. The partitioning of the previously mentioned components facilitates the protection of air and water quality, protects animal health, and improves the management of an animal waste management system. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Transfer (634), Amendments for the Treatment of Agricultural Waste (591), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

**Before Situation:**

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

**After Situation:**

One small screw or roller press type separation facility installed at livestock facility before storage or treatment or after treatment, for example, after an anaerobic digester. Part of an animal waste management system.

**Feature Measure:** Item

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $49,177.38

**Scenario Cost/Unit:** $49,177.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 10 | $2,809.70 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Screw or Roller Press - Small | 1950 | Screw or Roller Press with a capacity of < 100 GPM. Includes materials and equipment. | Each | $44,000.00 | 1 | $44,000.00 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 632 - Waste Separation Facility

**Scenario** #6 - Concrete Sand Settling Lane

**Scenario Description:**

A concrete structure, a concrete lane with curbs, used to capture and separate a portion of the solids, mainly sand, from a liquid stream from a confinement facility. Removes as portion of the solids to facilitate waste handling and to address water quality concerns. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Transfer (634), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

**Before Situation:**

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

**After Situation:**

One concrete settling lane structure (25 ft wide by 200 ft long by 0.5 ft thick) constructed around or at a livestock feeding operation. Removes a portion of the solids (sand) that otherwise would leave with the runoff from an animal feeding operation. Part of an animal waste management system.

**Feature Measure:** Square Foot of Settling Lane Footpr

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 5,000.0

**Scenario Total Cost:** $38,234.22

**Scenario Cost/Unit:** $7.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 90 | $25,287.30 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 20 | $8,739.80 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 180 | $415.80 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 90 | $393.30 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 90 | $2,564.10 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 632 - Waste Separation Facility

**Scenario** #7 - Separator, Sloped Screen

**Scenario Description:**

A sloped screen mechanical separation facility to partition solids, liquids, and/or associated nutrients from animal waste streams. The partitioning of the previously mentioned components facilitates the protection of air and water quality, protects animal health, and improves the management of an animal waste management system. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Transfer (634), Amendments for the Treatment of Agricultural Waste (591), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

**Before Situation:**

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

**After Situation:**

One sloped screen type separation facility installed at livestock facility before storage or treatment or after treatment, for example, after an anaerobic digester. Part of an animal waste management system.

**Feature Measure:** Item

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $40,879.18

**Scenario Cost/Unit:** $40,879.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Safety Guard, pipe fence and tractor guard | 1953 | Pipe fence and tractor guard 4' tall with working loads expected from equipment and livestock. Materials and shipping only. | Foot | $280.66 | 25 | $7,016.50 |
| Static Inclined Screen, medium (300-700 GPM capacity) | 2273 | Static Inclined Screen includes materials and equipment. Includes shipping. | Gallon per Minute | $62.99 | 500 | $31,495.00 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 632 - Waste Separation Facility

**Scenario** #10 - Separator, Two Stage Unit

**Scenario Description:**

A single two stage separator unit is installed to partition solids, liquids, and/or associated nutrients from animal waste streams. The single unit includes a screen and roller or screw press and is not two separate pieces of equipment in series. This piece of equipment facilitates the protection of air and water quality, protects animal health, and improves the management of an animal waste management system. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Transfer (634), Amendments for the Treatment of Agricultural Waste (591), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

**Before Situation:**

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

**After Situation:**

One two-stage combination separator unit is installed at a livestock facility before storage or treatment or after treatment, for example, after an anaerobic digester. Part of an animal waste management system. The payment is based on each combination unit installed, not the flow. The actual flow may vary from what was used in this scenario's components.

**Feature Measure:** Item

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $81,794.00

**Scenario Cost/Unit:** $81,794.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Screw or Roller Press - Small | 1950 | Screw or Roller Press with a capacity of < 100 GPM. Includes materials and equipment. | Each | $44,000.00 | 1 | $44,000.00 |
| Static Inclined Screen, medium (300-700 GPM capacity) | 2273 | Static Inclined Screen includes materials and equipment. Includes shipping. | Gallon per Minute | $62.99 | 600 | $37,794.00 |

**Practice:** 633 - Waste Recycling

**Scenario** #1 - Export Ag Waste By-products Recycled for Use Off Farm

**Scenario Description:**

Agricultural by-products on the farm are in excess of the ability of the farm and limited crop landbase to utilize. These waste materials are accumulating in such a manner that the water, soil and/or air quality have resource concerns. The application of a waste management plan will recycle these by-products such that the quality of the natural resources will be improved and the environment protected. The agricultural by-products are tested and exported off the farm operation for external uses. Records are kept detailing disposition of the waste, including date, amount, and receiver of the waste. Results of the agricultural by-product laboratory analysis is also provided to the receiver. Associated practices: 313-Waste Storage Facility, 317-Composting Facility, 590-Nutrient Management

**Before Situation:**

Agricultural by-products are produced or accumulated on the farm in amounts that cannot be utilized by the farm without causing resource concerns such as degradation of water quality, soil health and/or air quality.

**After Situation:**

Twice a year the excess agricultural by-products that have been collected at the farm are sampled and laboratory tested to determine the characteristics of the waste material that is recycled. The results of this analysis will determine the basis of its use. The agricultural by-products are then handled according to the waste management system plan. The intended off-farm use of the recycled agricultural waste by-products will refer to the laboratory analysis. Records shall be kept of the analysis, dates and quantities of recycled waste exported.

**Feature Measure:** Farm

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $506.02

**Scenario Cost/Unit:** $506.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $45.54 | 2 | $91.08 |

**Practice:** 634 - Waste Transfer

**Scenario** #1 - Wastewater catch basin less than 1000 gal.

**Scenario Description:**

Installation for a wastewater collection system that includes materials and structures to collect liquids of a design volume less than 1000 gallons such as silage leachate, lot runoff and other contaminated liquid effluent. This may include curbs, screens, precast manholes, sumps or catch basins. The wastewater will typically be transferred from the collection basin to a waste storage facility through a gravity or low pressure flow conduit. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling. This scenario addresses the potential for surface water and groundwater quality degradation from liquid wastewater running unchecked out of silage bunkers and off of animal feeding lots.

**Before Situation:**

Inadequate storage is available to collect wastewater from an operation that may contaminate surface or groundwater resources. The liquids contain few solids or limited solids that can be easily screened out without blocking the collection intake.

**After Situation:**

This practice scenario is suitable where the estimated design volume for wastewater transfer is less than 1000 gallons of contaminated liquid that may flow from silage bunkers or animal lot areas after a precipitation event. The practice scenario typically includes materials and installation of flat and formed concrete for curbs and/or gutters to collect liquids. With the installation of a precast manhole with lid or catch basin with grate. The cost includes excavation, placement of bedding as needed, placement of structure and backfill with construction of concrete inlet collection area. Transfer pump if needed must be contracted under pumping plant, PS 533.

**Feature Measure:** Collection volume installed

**Scenario Unit::** Gallon

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $8,009.14

**Scenario Cost/Unit:** $8.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 4 | $1,123.88 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 2 | $873.98 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 4 | $259.68 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 4 | $226.56 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 2 | $23.30 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 32 | $867.84 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 16 | $756.00 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 5 | $98.20 |
| Catch Basin, concrete, 60" dia. | 1754 | Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only. | Each | $2,184.26 | 1 | $2,184.26 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #2 - Wastewater reception pit or basin 1000 to 5000 gal.

**Scenario Description:**

Installation for a wastewater collection system that includes materials and structures to collect liquids of a design volume between 1000 and 5000 gallons such as silage leachate, lot runoff and other contaminated liquid effluent. This scenario includes a reinforced concrete manure reception pit for temporary storage and transfer of manure and wastewater for an animal operation. Reception Pit includes safety fence w/gate or solid/grated cover. The wastewater will typically be transferred from the collection basin to a waste storage facility through a gravity or low pressure flow conduit. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling. This scenario addresses the potential for surface water and groundwater quality degradation from liquid wastewater running unchecked out of silage bunkers and off of animal feeding lots.

**Before Situation:**

Inadequate storage is available to collect wastewater from an operation that may contaminate surface or groundwater resources.

**After Situation:**

This practice scenario is suitable where the estimated design volume for waste collection and transfer is between 1000 and 5000 gallons of liquid waste. The practice scenario typically includes materials and installation of flat and formed concrete for curbs and gutters to collect liquid slurry waste and the installation of an 8'x12'x6' reinforced concrete reception pit formed in place that includes safety fence w/gate or solid/grated cover. The cost includes excavation, placement of subgrade as needed, forming, pouring and finishing of concrete structure and backfilling. Transfer pump if needed must be contracted under pumping plant, PS 533.

**Feature Measure:** Collection volume installed

**Scenario Unit::** Gallon

**Scenario Typical Size:** 4,300.0

**Scenario Total Cost:** $14,920.31

**Scenario Cost/Unit:** $3.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 6 | $1,685.82 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 14 | $6,117.86 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 24 | $1,320.72 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 8 | $519.36 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 8 | $453.12 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 3 | $34.95 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 64 | $1,817.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 24 | $650.88 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 24 | $1,134.00 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 12 | $235.68 |
| Safety chain tractor barrier | 1725 | 3/8 in. Transport chain barrier installed to prevent tractor equipment from entering wastewater collection basin or pit. Material cost only. | Foot | $2.91 | 40 | $116.40 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #3 - Wastewater reception pit larger than 5000 gal.

**Scenario Description:**

Installation for a wastewater collection system that includes materials and structures to collect liquids of a design volume greater than 5000 gallons such as lot runoff, manure slurry and other contaminated liquid effluent. The wastewater collected in this pit is intended to be transferred to final storage within a 48 hour period. This scenario includes a reinforced concrete manure reception pit for temporary storage and transfer of manure and wastewater for an animal operation. Reception Pit includes safety fence w/gate or solid/grated cover. The wastewater will typically be transferred from the collection basin to a waste storage facility through a gravity or low pressure flow conduit. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling. This scenario addresses the potential for surface water and groundwater quality degradation from liquid wastewater running unchecked out of silage bunkers and off of animal feeding lots.

**Before Situation:**

Inadequate storage is available to collect wastewater from an operation that may contaminate surface or groundwater resources.

**After Situation:**

This practice scenario is suitable where the estimated maximum design volume for wastewater collected is greater than 5000 gallons of liquid waste within 48 hours or before it is stored or treated. The practice scenario typically includes materials and installation of flat and formed concrete for curbs and gutters inlet area to collect liquid slurry waste and the installation of an 12 ft wide x 16 ft long x 6 ft deep reinforced concrete reception pit formed in place that includes safety fence w/gate or solid/grated cover. The cost includes excavation, placement of subgrade as needed, forming, pouring and finishing of concrete structure and backfilling. Transfer pump if needed must be contracted under pumping plant, PS 533.

**Feature Measure:** Collection volume installed

**Scenario Unit::** Gallon

**Scenario Typical Size:** 8,600.0

**Scenario Total Cost:** $22,530.25

**Scenario Cost/Unit:** $2.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 11 | $3,090.67 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 22 | $9,613.78 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 32 | $1,760.96 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 12 | $779.04 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 16 | $906.24 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 4 | $46.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 80 | $2,272.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 32 | $867.84 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 15 | $294.60 |
| Safety chain tractor barrier | 1725 | 3/8 in. Transport chain barrier installed to prevent tractor equipment from entering wastewater collection basin or pit. Material cost only. | Foot | $2.91 | 60 | $174.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #4 - Concrete Channel

**Scenario Description:**

Installation of a concrete channel that consists of a slab with curb and footing on each side of the slab for the entire length of the channel to enable the facility manager to direct liquid waste to an existing collection basin and/or waste storage facility. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

**After Situation:**

Typical installation of a 12 foot wide 100' long concrete channel that consists of a 6" thick concrete slab with curbing on each side of the slab that is 2' high, 6" thick with footing for the entire length. The purpose is to transfer liquids or manure slurry from one area to an existing collection basin or waste storage facility. Includes safety chain for equipment. Alternative configurations can consist of the installation of a more narrow or wider channel that may or may not have curbs or a deeper shaped channel and may include a half pipe on the bottom.

**Feature Measure:** Bottom surface area of concrete ch

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1,200.0

**Scenario Total Cost:** $14,742.02

**Scenario Cost/Unit:** $12.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 23 | $6,462.31 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 11 | $4,806.89 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 8 | $519.36 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 4 | $46.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 8 | $321.28 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 26 | $510.64 |
| Safety gate, span manure transfer channel or chute | 1952 | Safety gate to span manure transfer channel at push off wall or chute outlet. Minimum of 4' tall with openings that will not pass a 6" or larger sphere. Includes materials only. | Foot | $15.71 | 16 | $251.36 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #6 - Catch Basin with 30 inch diameter double wall gravity pipe

**Scenario Description:**

Gravity flow conduit is typically a large diameter water tight HDPE sanitary sewer pipe used to transfer manure by gravity from one location to another. The gravity transfer system typically consists of a catch basin with an adaptor to a smooth interior large diameter HDPE pipe. Adequate head on the pipe flow or change in elevation must be available for the gravity system to function and should be evaluated by the design engineer. This practice includes the inlet structure, transfer pipe plus an and all other fittings, trench excavation and backfill, labor and equipment for installation. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

Install an 80 foot long gravity transfer system of a precast catch basin with an adaptor to a water tight smooth interior 30"diameter HDPE sanitary sewer grade pipe that will flow to an outlet at the site of manure treatment or storage. This scenario includes the catch basin, pipe, inlet, outlet, couplers and all other fittings, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure there is adequate elevation drop before contracting. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

**Feature Measure:** Length of pipe installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $11,033.87

**Scenario Cost/Unit:** $137.92

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 7 | $1,966.79 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 61 | $140.91 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 33 | $190.41 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 15 | $53.85 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 16 | $985.44 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 4 | $46.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 36 | $1,022.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 16 | $642.56 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 16 | $756.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 7 | $196.77 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 7 | $137.48 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 30" | 1247 | Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $30.80 | 88 | $2,710.40 |
| Catch Basin, concrete, 60" dia. | 1754 | Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only. | Each | $2,184.26 | 1 | $2,184.26 |

**Practice:** 634 - Waste Transfer

**Scenario** #7 - 30 inch diameter Double Wall Gravity Pipe

**Scenario Description:**

Gravity flow conduit is typically a large diameter water tight HDPE sanitary sewer pipe used to transfer manure by gravity from one location to another. The gravity transfer system typically consists of an existing inlet structure or hopper with attachment to a smooth interior large diameter pipe. The pipe conveys the slurry waste liquid between the waste collection point and a manure storage or waste treatment structure. Adequate head on the pipe flow or change in elevation must be available for the gravity system to function and should be evaluated by the design engineer. This practice includes the pipe attachment to an existing inlet structure and all other fittings, trench excavation and backfill, labor and a equipment for installation. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

Install a 150 foot long 30" diameter water tight HDPE pipe to transfer manure by gravity from one location to another. A gravity transfer system typically consists of a sealed inlet at an existing waste collection structure to a smooth interior 30" sewer grade pipe that will gravity flow to an outlet at a site of manure treatment or storage. This scenario includes the pipe, inlet, outlet, couplers and all other fittings, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure there is adequate elevation drop before contracting. If required an inlet structure may be contracted under another scenario. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

**Feature Measure:** Length of pipe installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $15,014.45

**Scenario Cost/Unit:** $100.10

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 14 | $3,933.58 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 125 | $288.75 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.77 | 57 | $328.89 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 45 | $161.55 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 30 | $1,650.90 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 7 | $81.55 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 30 | $813.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 20 | $945.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 13 | $365.43 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 30" | 1247 | Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $30.80 | 165 | $5,082.00 |

**Practice:** 634 - Waste Transfer

**Scenario** #8 - Agitator-small

**Scenario Description:**

This scenario is for a manure and wastewater agitator associated with an agricultural production operation to transfer agricultural waste product from the production source to a storage facility for proper utilization. This agitator is typically no more than 15 HP and is used for smaller waste storage facilities that are less than 10 feet deep. This scenario does not include a pump. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling The waste transfer equipment is installed to address water quality concerns by facilitating timely land application of waste at agronomic rates according to the nutrient management plan. This scenario addresses the potential for surface water and groundwater quality degradation.

**Before Situation:**

In this typical setting, the operator has a small waste storage structure from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.

**After Situation:**

The typical installation would be for a small manure 10 HP agitator to put settled manure solids into suspension for removal from an animal waste storage structure and transfer to the next step of waste treatment, utilization or storage. Part of an animal waste management system to address water quality concerns. If required a wastewater reception pit, concrete channel or transfer conduit scenario may need to be contracted to support the operation of this waste transfer system equipment.

**Feature Measure:** Agitator for wastewater, installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $12,091.15

**Scenario Cost/Unit:** $12,091.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 11 | $429.66 |
| **Materials** | | | | | | |
| Manure agitator, mixing depth less than 10 feet. | 1768 | Agitator to move put settled manure solids into suspension for removal from an animal waste storage structure. Materials only. | Each | $11,523.81 | 1 | $11,523.81 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |

**Practice:** 634 - Waste Transfer

**Scenario** #9 - Agitator-medium

**Scenario Description:**

This scenario is for a manure and wastewater agitator associated with an agricultural production operation to transfer agricultural waste product from the storage facility to a site for proper utilization. This agitator is typically 30 HP and is used where the waste storage facility tank or pond is between 10 and 15 feet deep. The scenario included the stand, a wall to mount the stand on, the separator and installation of the separator. This scenario does not include a pump. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling The waste transfer equipment is installed to address water quality concerns by facilitating timely land application of waste at agronomic rates according to the nutrient management plan. This scenario addresses the potential for surface water and groundwater quality degradation.

**Before Situation:**

In this typical setting, the operator has waste production from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.

**After Situation:**

A typical installation would be for a medium 30 HP manure agitator to put settled manure solids into suspension for removal from an animal waste storage structure and transfer to the next step of waste treatment, utilization or storage. Part of an animal waste management system to address water quality concerns. If required a wastewater reception pit, concrete channel or transfer conduit scenario may need to be contracted to support the operation of this waste transfer system equipment.

**Feature Measure:** Agitator for wastewater, installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $18,613.58

**Scenario Cost/Unit:** $18,613.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 12 | $468.72 |
| **Materials** | | | | | | |
| Manure agitator, mixing depth 10 to 15 feet deep | 1766 | Agitator to move put settled manure solids into suspension for removal from an animal waste storage structure. Materials only. | Each | $17,809.52 | 1 | $17,809.52 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 634 - Waste Transfer

**Scenario** #10 - Agitator-large

**Scenario Description:**

This scenario is for a large manure and wastewater agitator associated with an agricultural production operation to transfer agricultural waste product from the storage facility to a site for proper utilization. This agitator is typically 100 HP and is used where the waste storage facility tank or pond is greater than15 feet deep. The scenario included the stand, a wall to mount the stand on, the separator and installation of the separator. This scenario does not include a pump. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling The waste transfer equipment is installed to address water quality concerns by facilitating timely land application of waste at agronomic rates according to the nutrient management plan. This scenario addresses the potential for surface water and groundwater quality degradation.

**Before Situation:**

In this typical setting, the operator has waste production from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.

**After Situation:**

A typical installation would be for a large 100 HP manure agitator to put settled manure solids into suspension for removal from an animal waste storage structure and facilitate the transfer of this material to the next step of waste treatment or utilization. This agitator is for a tank deeper than 15 feet and is part of an animal waste management system to address water quality concerns. This covers the cost of the agitator equipment materials and labor for the electrical hook-up.

**Feature Measure:** Agitator for wastewater, installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $27,157.78

**Scenario Cost/Unit:** $27,157.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 12 | $468.72 |
| **Materials** | | | | | | |
| Manure agitator, mixing depth greater than 15 feet deep. | 1767 | Agitator to move put settled manure solids into suspension for removal from an animal waste storage structure. Materials only. | Each | $26,190.48 | 1 | $26,190.48 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #12 - PVC Pipe, less than or equal to 8 inch dia

**Scenario Description:**

Installation of an outlet line with a diameter of 8" or less to convey waste water. Placement of the pipe will be through an area that requires no additional work due to obstructions such as concrete slabs, utilities, or buildings, etc. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources. Typical scenario is to construct 1/4 mile (1,320 feet) of 6", Class 160, PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 1,320 feet of 6", Class 160 PVC gasketed IPS pipe weighs 3.4 lb/ft, or a total of 4,488 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 2% of pipe material quantity) for a total weight of 4578 pounds. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

**Feature Measure:** Pounds of pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 4,488.0

**Scenario Total Cost:** $12,404.36

**Scenario Cost/Unit:** $2.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 1320 | $1,795.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 4578 | $9,201.78 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #13 - PVC Pipe, less than or equal to 8 in dia, adverse installation conditions

**Scenario Description:**

Installation of an outlet line with a diameter of 8" or less to convey waste water. Placement of the pipe will be through an area that requires additional work, such as under existing concrete slabs, under or through existing utilities, through barns, etc. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources. Typical scenario is to construct 100 feet of 6", Class 160, PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 100 feet of 6", Class 160 PVC gasketed IPS pipe weighs 3.4 lb/ft, or a total of 340 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 2% of pipe material quantity) for a total weight of 347 pounds. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements..

**Feature Measure:** Pounds of pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 340.0

**Scenario Total Cost:** $2,620.91

**Scenario Cost/Unit:** $7.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 4 | $1,123.88 |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 100 | $136.00 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 4 | $46.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 3 | $85.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 340 | $683.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #14 - PVC Pipe, greater than 8 inch dia.

**Scenario Description:**

Installation of a transfer line with a diameter of greater than 8-inches to convey waste water. Placement of the pipe will be through an area that requires no additional work due to obstructions such as concrete slabs, utilities, or buildings, etc. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

The transfer conduit will provide collection and transportation of the manure slurry, thereby protecting water quality resources. Typical scenario is to construct 1/4 mile (1,320 feet) of 12" PVC, ASTM-3034, SDR 35 with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 1,320 feet of 12", SDR 35 PVC pipe weighs 9.5 lb/ft, or a total of 12,540 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 2% of pipe material quantity) for a total weight of 12,791. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

**Feature Measure:** Pounds of pipeline

**Scenario Unit::** Pound

**Scenario Typical Size:** 16,830.0

**Scenario Total Cost:** $31,361.09

**Scenario Cost/Unit:** $1.86

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 60 | $138.60 |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $3.11 | 1320 | $4,105.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 12791 | $25,709.91 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #15 - PVC Pipe, greater than 8 inch dia, adverse installation conditions

**Scenario Description:**

Installation of a transfer line with a diameter of greater than 8-inches to convey waste water. Placement of the pipe will be through an area that requires additional work, such as under existing concrete slabs, under or through existing utilities, through barns, etc. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

The transfer conduit will provide collection and transportation of the manure slurry, thereby protecting water quality resources. Typical scenario is to construct 100 feet of 12", 12 inch gasketed PVC sewer pipe (SDR 35, ASTM D3034); wt. = 9.5 lb/ft with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 100 feet of 12", 9.5 lbs/ft, or a total of 950 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 2% of pipe material quantity) for a total weight of 969 pounds. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements..

**Feature Measure:** Pounds of pipeline

**Scenario Unit::** Pound

**Scenario Typical Size:** 950.0

**Scenario Total Cost:** $4,060.20

**Scenario Cost/Unit:** $4.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 4 | $1,123.88 |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $3.11 | 100 | $311.00 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 4 | $46.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 3 | $85.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 969 | $1,947.69 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #16 - HDPE Pipe, less than or equal to 6 inch dia.

**Scenario Description:**

Installation of an HDPE outlet line with a diameter of 6" or less to convey waste water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources. The typical scenario is for the installation of 1/4 mile (1320') of 6" SDR 17 (100 psi) HDPE pipeline. Pipe weight is 4.87 lbs/ft for a total weight of 6,432 lbs. Fittings, valves and appurtenances are included and are estimated at 2% of the pipe weight for a total weight of 6,561 lbs.

**Feature Measure:** Pounds of pipeline

**Scenario Unit::** Pound

**Scenario Typical Size:** 6,432.0

**Scenario Total Cost:** $21,508.80

**Scenario Cost/Unit:** $3.34

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $3.11 | 1320 | $4,105.20 |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 16 | $390.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 6557 | $15,605.66 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #17 - HDPE Pipe, less than or equal to 6 inch dia, adverse installation conditions

**Scenario Description:**

Installation of an HDPE outlet line with a diameter of 6" or less to convey waste water in adverse conditions such as under concrete. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources. The typical scenario is for the installation of 100' of 6" SDR 17 (100 psi) HDPE pipeline under concrete. Pipe weight is 3.34 lbs/ft for a total weight of 334 lbs. Fittings, valves and appurtenances are included and are estimated at 2% of the pipe weight for a total weight of 341 lbs.

**Feature Measure:** Pounds of pipeline

**Scenario Unit::** Pound

**Scenario Typical Size:** 334.0

**Scenario Total Cost:** $2,363.26

**Scenario Cost/Unit:** $7.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 2 | $561.94 |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $3.11 | 100 | $311.00 |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 1 | $24.41 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 2 | $23.30 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 3 | $85.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 341 | $811.58 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #18 - HDPE Pipe, greater than 6 inch dia.

**Scenario Description:**

Installation of an HDPE outlet line with a diameter of greater than 6" to convey waste water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources. The typical scenario is for the installation of 1/4 mile (1320') of 12" SDR 17 (100 psi) HDPE pipeline. Pipe weight is 12.36 lbs/ft for a total weight of 16315 lbs. Fittings, valves and appurtenances are included and are estimated at 2% of the pipe weight for a total weight of 16,642 lbs.

**Feature Measure:** Pounds of pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 16,315.0

**Scenario Total Cost:** $45,511.10

**Scenario Cost/Unit:** $2.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $3.11 | 1320 | $4,105.20 |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 16 | $390.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 16642 | $39,607.96 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #19 - HDPE Pipe, greater than 6 inch dia., adverse installation conditions

**Scenario Description:**

Installation of an HDPE outlet line with a diameter greater than to convey waste water in sites with adverse installation conditions such as installation under concrete. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources. The typical scenario is for the installation of 100' of 12" SDR 17 (100 psi) HDPE pipeline under concrete. Pipe weight is 12.36 lbs/ft for a total weight of 1236 lbs. Fittings, valves and appurtenances are included and are estimated at 2% of the pipe weight for a total weight of 1260 lbs.

**Feature Measure:** Pounds of pipeline

**Scenario Unit::** Pound

**Scenario Typical Size:** 1,236.0

**Scenario Total Cost:** $5,135.72

**Scenario Cost/Unit:** $4.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 4 | $1,123.88 |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $3.11 | 100 | $311.00 |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $24.41 | 1 | $24.41 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 4 | $46.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 3 | $85.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.38 | 1260 | $2,998.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #20 - Conveyor belt

**Scenario Description:**

Installation of a manure transfer conveyor belt for transfer of solid manure. Scenario unit is in feet, however the systems come in some typical lengths. The length used for contracting should be based on available lengths from local manufacturers. Typical systems come in 10'-100' sections, but site specific lengths may be available. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage.

**After Situation:**

The transfer belt will provide for transfer of solid manure to a safe storage area, runoff is addressed. The typical scenario is for the installation of a 300' long conveyor system

**Feature Measure:** Length of conveyor

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $20,103.73

**Scenario Cost/Unit:** $67.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Manure Transfer, 300' Conveyor belt system | 1772 | Conveyor belt system consisting of 3 conveyors. 100 ft collection conveyor to a 10 ft x 10 ft lean-to with a concrete floor and metal walls on the outside of the animal housing building to a 100 ft long vertical lift conveyor that drops to a 100 ft long plow off conveyor in the manure storage facility for stacking of litter. Includes shipping. | Each | $19,391.43 | 1 | $19,391.43 |

**Practice:** 634 - Waste Transfer

**Scenario** #21 - Transfer Slab

**Scenario Description:**

Installation of a concrete slab to enable the facility manager to direct liquid waste to an existing collection basin and/or waste storage facility. Note that this scenario would also be appropriate to use in sites where only curbs or speedbumps are installed. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

**After Situation:**

Typical installation of a100' long by 40' wide concrete slab with curbs on 3 sides. The purpose is to transfer liquids or manure slurry from one area to an existing collection basin or waste storage facility. Includes safety chain for equipment. Alternative configurations can consist of the installation of a more narrow or wider channel that may or may not have curbs or a deeper shaped channel and may include a half pipe on the bottom.

**Feature Measure:** Bottom surface area of concrete ch

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,000.0

**Scenario Total Cost:** $24,056.71

**Scenario Cost/Unit:** $6.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 77 | $21,634.69 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 148 | $341.88 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 74 | $2,080.14 |

**Practice:** 634 - Waste Transfer

**Scenario** #22 - Transfer Slab, Remote Location

**Scenario Description:**

Installation of a concrete slab to enable the facility manager to direct liquid waste to an existing collection basin and/or waste storage facility. Note that this scenario would also be appropriate to use in sites where only curbs or speedbumps are installed. This scenario covers additional costs associated with remote locations. Remote locations must be greater than 30 miles from nearest certified batch plant. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

**After Situation:**

Typical installation of a100' long by 40' wide concrete slab with curbs on 3 sides. The purpose is to transfer liquids or manure slurry from one area to an existing collection basin or waste storage facility. Includes safety chain for equipment. Alternative configurations can consist of the installation of a more narrow or wider channel that may or may not have curbs or a deeper shaped channel and may include a half pipe on the bottom.

**Feature Measure:** Bottom surface area of concrete ch

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,000.0

**Scenario Total Cost:** $27,116.71

**Scenario Cost/Unit:** $6.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 77 | $21,634.69 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 148 | $341.88 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 74 | $2,080.14 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 3000 | $3,060.00 |

**Practice:** 634 - Waste Transfer

**Scenario** #23 - Collection Slab Regrade

**Scenario Description:**

Regrading of an existing concrete slab to enable the facility manager to direct liquid waste to an existing collection basin and/or waste storage facility. Note that this scenario would also be appropriate to use in sites where only curbs or speedbumps are installed. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

**After Situation:**

Includes removal of existing concrete, placement of sand for base and to regrade the area and pouring of new slab with curbs. The purpose is to transfer liquids or manure slurry from one area to an existing collection basin or waste storage facility. Includes safety chain for equipment. Typical installation of a100' long by 40' wide concrete slab with curbs on 3 sides. Sand layer is 8" average over the area.

**Feature Measure:** slab area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,000.0

**Scenario Total Cost:** $25,621.56

**Scenario Cost/Unit:** $6.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 77 | $21,634.69 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 148 | $341.88 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 74 | $862.10 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 99 | $2,782.89 |

**Practice:** 634 - Waste Transfer

**Scenario** #24 - Collection Slab Regrade, Remote Location

**Scenario Description:**

Regrading of an existing concrete slab to enable the facility manager to direct liquid waste to an existing collection basin and/or waste storage facility. Note that this scenario would also be appropriate to use in sites where only curbs or speedbumps are installed. This scenario covers additional costs associated with remote locations. Remote locations must be greater than 30 miles from nearest certified batch plant. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

**After Situation:**

Includes removal of existing concrete, placement of sand for base and to regrade the area and pouring of new slab with curbs. The purpose is to transfer liquids or manure slurry from one area to an existing collection basin or waste storage facility. Includes safety chain for equipment. Typical installation of a100' long by 40' wide concrete slab with curbs on 3 sides. Sand layer is 8" average over the area.

**Feature Measure:** slab area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,000.0

**Scenario Total Cost:** $28,681.56

**Scenario Cost/Unit:** $7.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 77 | $21,634.69 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 148 | $341.88 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.65 | 74 | $862.10 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 99 | $2,782.89 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been i | Dollar | $1.02 | 3000 | $3,060.00 |

**Practice:** 634 - Waste Transfer

**Scenario** #25 - Manure Auger

**Scenario Description:**

Installation of a auger conveyor belt for transfer of solid manure. Scenario unit is in feet, however the systems come in some typical lengths. The length used for contracting should be based on available lengths from local manufacturers. Typical lengths are often 12' sections. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage.

**After Situation:**

Auger will transfer dry manure to a storage site. Typical scenario is for a 12' long auger

**Feature Measure:** Length of auger

**Scenario Unit::** Foot

**Scenario Typical Size:** 12.0

**Scenario Total Cost:** $5,812.14

**Scenario Cost/Unit:** $484.35

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Manure Transfer, Auger or screw conveyor to transfer waste solids | 1773 | Auger or screw conveyor to transfer waste solids to a storage facility or manure spreading equipment. Includes shipping. | Each | $5,099.84 | 1 | $5,099.84 |

**Practice:** 634 - Waste Transfer

**Scenario** #26 - Transfer curb, 2 feet tall with footing

**Scenario Description:**

Installation of a concrete curb to enable the facility manager to direct liquid waste to an existing collection basin and/or waste storage facility. Note that this scenario would also be appropriate to use in sites where only curbs or speedbumps are installed. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

**After Situation:**

Typical installation of a 100' long concrete curb 6" wide by 2' tall with a 1.5" heel and 6" toe. The purpose is to transfer liquids or manure slurry from one area to an existing collection basin or waste storage facility. Includes safety chain for equipment.

**Feature Measure:** length of curb

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,038.22

**Scenario Cost/Unit:** $30.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 8.3 | $2,332.05 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 9.3 | $21.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 4.6 | $129.31 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #27 - Transfer curb, 6 inch tall, with footing

**Scenario Description:**

Installation of a concrete curb to enable the facility manager to direct liquid waste to an existing collection basin and/or waste storage facility. Note that this scenario would also be appropriate to use in sites where only curbs or speedbumps are installed. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

**After Situation:**

Typical installation of a 100' long concrete curb 6" wide by 6" tall with a 6" heel and 6" toe. The purpose is to transfer liquids or manure slurry from one area to an existing collection basin or waste storage facility. Includes safety chain for equipment.

**Feature Measure:** length of curb

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,776.53

**Scenario Cost/Unit:** $17.77

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 4 | $1,123.88 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 5.6 | $12.94 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 3 | $84.33 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #28 - Transfer curb, 1 foot tall, with footing

**Scenario Description:**

Installation of a concrete curb to enable the facility manager to direct liquid waste to an existing collection basin and/or waste storage facility. Note that this scenario would also be appropriate to use in sites where only curbs or speedbumps are installed. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

**After Situation:**

Typical installation of a 100' long concrete curb 6" wide by 12" tall with a 8" heel and 6" toe. The purpose is to transfer liquids or manure slurry from one area to an existing collection basin or waste storage facility. Includes safety chain for equipment.

**Feature Measure:** length of curb

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,058.88

**Scenario Cost/Unit:** $20.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 5 | $1,404.85 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 6.2 | $14.32 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 3 | $84.33 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 634 - Waste Transfer

**Scenario** #40 - Directional Drilling

**Scenario Description:**

Description: Below ground installation of pipeline requiring boring under a structure or stream. Scenario covers excavation to place directional drill, drilling under road or stream and placement of 'sleeve pipe', placement of PVC pipe, all fittings, thrust blocks and appurtenances and backfill & final grading of the trench. Document reason a cut and cover scenario is not suitable. Resource Concerns: This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in groundwater. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

Storage located on the far side of a stream or structure from waste source, or an above ground pipeline or temporary pipeline is used to cross a stream or a temporary pipeline is placed under a structure, road, or culvert. Manure may leak during application at fittings, there is an increased risk of discharge to a stream.

**After Situation:**

Pipeline installed to convey waste to storage facility, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use. Typical scenario is for boring 100' under a structure with a 10" steel casing pipe and a 8" inner PVC pipe. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow prevention devices.

**Feature Measure:** Length of drilling

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $12,785.58

**Scenario Cost/Unit:** $127.86

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 60 | $262.20 |
| Horizontal Boring, Greater Than 3" diameter | 1132 | Includes equipment, labor and setup. | Foot | $83.63 | 100 | $8,363.00 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.44 | 60 | $146.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| **Materials** | | | | | | |
| Pipe, Steel, 3", SCH 40 | 1003 | Materials: - 3" - Steel SCH 40 | Foot | $14.70 | 100 | $1,470.00 |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $2.01 | 611 | $1,228.11 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 635 - Vegetated Treatment Area

**Scenario** #1 - Surface application, Gravity flow

**Scenario Description:**

This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled gravity outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Waste Transfer (634), Roof Runoff Structure (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Livestock Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

**Before Situation:**

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

**After Situation:**

Typical VTA is 1.0 ac in size, includes a gravel trench for distribution flow (sheet flow) into the VTA. Typically requires grading and shaping, gravel spreader trenches and perforated pipe to maintain sheet flow throughout the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632). For milkhouse waste, Waste Treatment (629) could be contracted to provide pre-treatment prior to being released into the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

**Feature Measure:** Amount of VTA installed

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,733.90

**Scenario Cost/Unit:** $7,733.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 400 | $1,020.00 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 70 | $161.70 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 16 | $1,038.72 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 16 | $642.56 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 70 | $1,994.30 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.38 | 45 | $62.10 |
| Coupling, PVC, endcap, 2", SCH 20 | 1727 | 2" - PVC- SCH 40- ASTM D1785 pipe endcaps. Materials only. | Each | $1.86 | 15 | $27.90 |
| Pipe, PE, 6", DR 9, perforated | 1728 | Materials: -6" - Perforated PE- 160 psi - ASTM D3035 DR 9 | Foot | $20.64 | 80 | $1,651.20 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 635 - Vegetated Treatment Area

**Scenario** #2 - Wastewater is Pumped up to the VTA

**Scenario Description:**

This is a permanent herbaceous vegetative area or channel located upslope from the livestock production area. The topography of the site requires wastewater to be pumped uphill to the VTA designed system. Wastewater (runoff or milking parlor wastewater) is properly collected at the production area and pumped uphill to a shallow tank or basin where it has a controlled gravity outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Waste Transfer (634), Irrigation System, Sprinkler (442), Roof Runoff Structure (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Livestock Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629).

**Before Situation:**

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

**After Situation:**

Typical VTA is 1.0 ac in size, includes the installation site to be upslope from the production area with a shallow tank or basin that provides a controlled gravity outflow into the VTA. Typically requires grading and shaping, gravel spreader trenches and perforated pipe to maintain sheet flow throughout the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) and Pumping Plant (533) to get the wastewater upslope to the VTA distribution point. For milkhouse waste, Waste Treatment (629) could be contracted to provide pretreatment prior to being released into the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

**Feature Measure:** Amount of VTA installed

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $13,386.44

**Scenario Cost/Unit:** $13,386.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 2 | $561.94 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 12 | $5,243.88 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 400 | $1,020.00 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 100 | $231.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 6 | $168.66 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 70 | $1,994.30 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.38 | 45 | $62.10 |
| Ball Valve, 4" | 1726 | 4" ball valve, metal body. Materials only. | Each | $326.60 | 2 | $653.20 |
| Coupling, PVC, endcap, 2", SCH 20 | 1727 | 2" - PVC- SCH 40- ASTM D1785 pipe endcaps. Materials only. | Each | $1.86 | 15 | $27.90 |
| Pipe, PE, 6", DR 9, perforated | 1728 | Materials: -6" - Perforated PE- 160 psi - ASTM D3035 DR 9 | Foot | $20.64 | 80 | $1,651.20 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 635 - Vegetated Treatment Area

**Scenario** #3 - Mechanical distribution

**Scenario Description:**

This is a permanent herbaceous vegetative area located adjacent to a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected at the production area and pumped to mechanically distribute wastewater onto the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Waste Transfer (634), Irrigation System, Sprinkler (442), Roof Runoff Structure (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Livestock Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

**Before Situation:**

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

**After Situation:**

Typical VTA is 1.0 ac in size, includes the sizing, grading and shaping of the VTA area. Typically requires grading and shaping to maintain sheet flow onto the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) and Pumping Plant (533) to get the wastewater to the VTA mechanical distribution component that is contracted using Irrigation System, Sprinkler (442). For milkhouse waste, Waste Treatment (629) could be contracted to provide pretreatment prior to being pumped and distributed onto the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

**Feature Measure:** Amount of VTA installed

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,384.97

**Scenario Cost/Unit:** $2,384.97

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 16 | $1,038.72 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 16 | $642.56 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 635 - Vegetated Treatment Area

**Scenario** #4 - VTA using an Existing Vegetative Area

**Scenario Description:**

An existing permanent herbaceous vegetated area that meets the requirements for a VTA and is used as an overland flow area for nutrient rich runoff treatment. A flow distribution component is installed to achieve sheet flow at the start of the VTA. Clean runoff is diverted where possible. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich runoff that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Waste Transfer (634), Irrigation System, Sprinkler (442), Roof Runoff Structure (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Livestock Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment Area (629)

**Before Situation:**

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

**After Situation:**

Typical VTA is 1.0 ac in size, includes a gravel trench and perforated pipe to establish sheet flow into the VTA where and existing permanent herbaceous vegetated area meets the requirements for a VTA. Does not include any grading or seeding. The VTA practice will provide a controlled release of nutrient rich runoff into an existing vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich runoff and prevent contamination of surface and ground water resources.

**Feature Measure:** Amount of VTA treating wastewate

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $9,501.45

**Scenario Cost/Unit:** $9,501.45

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 7 | $3,058.93 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 445 | $1,134.75 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 75 | $173.25 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 75 | $2,136.75 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.38 | 40 | $55.20 |
| Coupling, PVC, endcap, 2", SCH 20 | 1727 | 2" - PVC- SCH 40- ASTM D1785 pipe endcaps. Materials only. | Each | $1.86 | 20 | $37.20 |
| Pipe, PE, 6", DR 9, perforated | 1728 | Materials: -6" - Perforated PE- 160 psi - ASTM D3035 DR 9 | Foot | $20.64 | 100 | $2,064.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 2 | $137.68 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 636 - Water Harvesting Catchment

**Scenario** #3 - Small Game Guzzler with Trough

**Scenario Description:**

Construct a collection apron, approximately 8 feet wide by 8 feet long, utilizing 28 gauge corrugated metal sheeting on an elevated wood-framed platform supported by T-posts; to collect rain water. Divert collected water from the collection apron by gravity through a 3" diameter, PVC SDR-35 pipe to a partially buried 500 gallon combined tank and watering trough located directly beneath the collection apron. The plastic tank/watering trough shall be outfitted with a wildlife escape ramp. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. Resource Concern: Wildlife - Inadequate livestock or wildlife water. Associated Practices: 382 - Fencing; 614 - Watering Facility; 516 - Livestock Pipeline; 342 - Critical Area planting

**Before Situation:**

Inadequate water available to address resource concerns. Wildlife (small game) have limited or no availability to water.

**After Situation:**

Design and construct an impervious surface as the primary collection component, and a pipe to a storage tank/watering trough for wildlife (small game).

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,566.79

**Scenario Cost/Unit:** $3,566.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 6 | $330.18 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 72 | $2,044.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 6 | $240.96 |
| **Materials** | | | | | | |
| Corrugated Steel, 28 gage | 223 | Corrugated or ribbed, galvanized, 28 gauge, includes fasteners, materials only. | Square Foot | $1.45 | 64 | $92.80 |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $25.16 | 1 | $25.16 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 32 | $30.72 |
| Post, Wood, CCA Treated, 4-5" X 7' | 1050 | Wood Post, Line 4-5" X 7', CCA Treated. Includes materials and shipping only. | Each | $8.12 | 8 | $64.96 |
| Tank, Poly enclosed Storage, 300-1000 gal | 1074 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.92 | 500 | $460.00 |
| Gutter, Downspout, PVC, 5" | 1388 | 5" PVC guttering. Materials only. | Foot | $0.48 | 5 | $2.40 |
| Gutter, Plastic, Small | 1389 | 5" PVC guttering emptying into a 4" PVC Sch-40 pipe | Foot | $2.32 | 11 | $25.52 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 636 - Water Harvesting Catchment

**Scenario** #4 - Big Game Guzzler with Trough

**Scenario Description:**

Construct a collection apron, approximately 8 feet wide by 20 feet long, utilizing 28 gauge corrugated metal sheeting on an elevated wood-framed platform supported by wood posts; to collect rain water. Divert collected water from the collection apron by gravity through a 3" diameter, PVC SDR-35 pipe to a partially buried 1500 gallon plastic tank. Water to be diverted from storage tank to nearby watering trough. The watering trough shall be outfitted with a wildlife escape ramp. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. Resource Concern: Wildlife - Inadequate livestock or wildlife water. Associated Practices: 382 - Fencing; 614 - Watering Facility; 516 - Livestock Pipeline; 342 - Critical Area planting

**Before Situation:**

Inadequate water available to address resource concerns. Wildlife (Big Game) have limited or no availability to water

**After Situation:**

Design and construct an impervious surface as the primary collection component, and a pipe to a storage tank/watering trough for wildlife (Big Game).

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $10,252.50

**Scenario Cost/Unit:** $10,252.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 40 | $2,201.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 120 | $3,408.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| **Materials** | | | | | | |
| Corrugated Steel, 28 gage | 223 | Corrugated or ribbed, galvanized, 28 gauge, includes fasteners, materials only. | Square Foot | $1.45 | 360 | $522.00 |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $25.16 | 1 | $25.16 |
| Tank, Spring or Trough, concrete, < 200 gallons | 282 | Concrete tank with sloping sides. Includes materials and shipping. | Each | $479.29 | 1 | $479.29 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 154 | $147.84 |
| Post, Wood, CCA Treated, 4-5" X 7' | 1050 | Wood Post, Line 4-5" X 7', CCA Treated. Includes materials and shipping only. | Each | $8.12 | 16 | $129.92 |
| Tank, Poly Enclosed Storage, >1,000 | 1075 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.97 | 1500 | $1,455.00 |
| Gutter, Downspout, PVC, 5" | 1388 | 5" PVC guttering. Materials only. | Foot | $0.48 | 6 | $2.88 |
| Gutter, Plastic, Small | 1389 | 5" PVC guttering emptying into a 4" PVC Sch-40 pipe | Foot | $2.32 | 11 | $25.52 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 636 - Water Harvesting Catchment

**Scenario** #5 - Poly Tank, Small, 1000 gallons or less

**Scenario Description:**

Install a small (typically 1000 gallons or less) above-ground poly tank to collect rain water an impervious surface (not an existing roof). Stored water can be used with watering facilities, irrigation systems, or other conservation practices. The tank shall be constructed of approved materials that stores adequate quantity and quality of water for storage and or direct drinking access. Additional components may be needed to channel water from the impervious surface to the storage tank. All components used will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. Resource concerns addressed include: Inadequate water quantity for livestock, wildlife or crops; habitat degradation, water quality, and undesirable plant productivity and health. Associated Practices: 614 - Watering Facility; 516 - Livestock Pipeline; 558 - Roof Runoff Structure; 620 - Underground Outlet; 430 - Irrigation Pipeline; 441 - Micro Irrigation; 533 - Pumping Plant; 342 - Critical Area Planting; 382 - Fencing

**Before Situation:**

Impervious surface currently exists, but there is no storage available. Water is not available in sufficient quantity or at the required times to provide for wildlife, livestock watering, irrigation, or for other conservation practices. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock, wildlife and or other conservation practices; where water is not available in sufficient quantities at specific locations; and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

A 750 gallon above-ground Poly tank with all tank materials, tank plumbing and float valve is installed to collect water from an impervious surface. Tank will provide adequate water storage capacity to ensure against inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, water quantity, crops, and undesirable plant productivity and health.

**Feature Measure:** Gallons of Tank Storage Capacity

**Scenario Unit::** Gallon

**Scenario Typical Size:** 750.0

**Scenario Total Cost:** $2,442.80

**Scenario Cost/Unit:** $3.26

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 6 | $330.18 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 6 | $240.96 |
| **Materials** | | | | | | |
| Tank, Poly enclosed Storage, 300-1000 gal | 1074 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.92 | 750 | $690.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 1.2 | $23.57 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 636 - Water Harvesting Catchment

**Scenario** #6 - Poly Tank, Large, >1000 gal

**Scenario Description:**

Install a large (typically > 1000 gallons) above-ground poly tank to collect rain water from an impervious surface (not an existing roof). Stored water can be used with watering facilities, irrigation systems, or other conservation practices. The tank shall be constructed of approved materials that stores adequate quantity and quality of water for storage and or direct drinking access. Additional components may be needed to channel water from the impervious surface to the storage tank. All components used will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. Resource concerns addressed include: Inadequate water quantity for livestock, wildlife or crops; habitat degradation, water quality, and undesirable plant productivity and health. Associated Practices: 614 - Watering Facility; 516 - Livestock Pipeline; 558 - Roof Runoff Structure; 620 - Underground Outlet; 430 - Irrigation Pipeline; 441 - Micro Irrigation; 533 - Pumping Plant; 342 - Critical Area Planting; 382 - Fencing

**Before Situation:**

An impervious surface currently exists, but there is no storage available. Water is not available in sufficient quantity or at the required times to provide for wildlife, livestock watering, irrigation, or for other conservation practices. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock, wildlife and or other conservation practices; where water is not available in sufficient quantities at specific locations; and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

A 3000 gallon, above-ground Poly tank with all tank materials, tank plumbing, float valve and other miscellaneous components is installed to collect water from an impervious surface. Tank will provide adequate water storage capacity to ensure against inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, water quantity, crops, and undesirable plant productivity and health.

**Feature Measure:** Gallons of Tank Storage Capacity

**Scenario Unit::** Gallon

**Scenario Typical Size:** 3,000.0

**Scenario Total Cost:** $5,201.17

**Scenario Cost/Unit:** $1.73

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $280.97 | 2 | $561.94 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 6 | $330.18 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 6 | $240.96 |
| **Materials** | | | | | | |
| Tank, Poly Enclosed Storage, >1,000 | 1075 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.97 | 3000 | $2,910.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 636 - Water Harvesting Catchment

**Scenario** #7 - Steel Tank with Liner, Small, 24K gal or less

**Scenario Description:**

Install a small (typically 24,000 gal or less) bottomless steel tank with a liner to collect rain water from an impervious surface (not an existing roof). Stored water can be used with watering facilities, irrigation systems, or other conservation practices. The tank shall be constructed of approved materials that stores adequate quantity and quality of water for storage and or direct drinking access. Additional components may be needed to channel water from the impervious surface to the storage tank. All components used will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. Resource concerns addressed include: Inadequate water quantity for livestock, wildlife or crops; habitat degradation, water quality, and undesirable plant productivity and health. Associated Practices: 614 - Watering Facility; 516 - Livestock Pipeline; 558 - Roof Runoff Structure; 620 - Underground Outlet; 430 - Irrigation Pipeline; 441 - Micro Irrigation; 533 - Pumping Plant; 342 - Critical Area Planting; 382 - Fencing

**Before Situation:**

An impervious surface currently exists, but there is no storage available. Water is not available in sufficient quantity or at the required times to provide for wildlife, livestock watering, irrigation, or for other conservation practices. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock, wildlife and or other conservation practices; where water is not available in sufficient quantities at specific locations; and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

A 12,000 gallon storage tank constructed using a bottomless steel tank with a liner is installed with all tank materials, tank plumbing and float valve and other miscellaneous components is installed to collect water from an impervious surface. Tank will provide adequate water storage capacity to ensure against inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, water quantity, crops, and undesirable plant productivity and health.

**Feature Measure:** Gallons of Tank Storage Capacity

**Scenario Unit::** Gallon

**Scenario Typical Size:** 12,000.0

**Scenario Total Cost:** $20,645.45

**Scenario Cost/Unit:** $1.72

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 16 | $880.48 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 120 | $3,408.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 17 | $461.04 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 24 | $1,134.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 3.7 | $104.01 |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $80.05 | 1 | $80.05 |
| Tank, Galvanized Steel Bottomless w/liner Livestock, > 6,000 gallon | 1072 | Includes tank materials, shipping, and float valve, no liner | Gallon | $1.20 | 12000 | $14,400.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 4.7 | $92.31 |

**Practice:** 636 - Water Harvesting Catchment

**Scenario** #8 - Steel Tank with Liner, Large, >24K gal

**Scenario Description:**

Install a large (typically >24,000 gal) bottomless steel tank with a liner to collect rain water from an impervious surface (not an existing roof). Stored water can be used with watering facilities, irrigation systems, or other conservation practices. The tank shall be constructed of approved materials that stores adequate quantity and quality of water for storage and or direct drinking access. Additional components may be needed to channel water from the impervious surface to the storage tank. All components used will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. Resource concerns addressed include: Inadequate water quantity for livestock, wildlife or crops; habitat degradation, water quality, and undesirable plant productivity and health. Associated Practices: 614 - Watering Facility; 516 - Livestock Pipeline; 558 - Roof Runoff Structure; 620 - Underground Outlet; 430 - Irrigation Pipeline; 441 - Micro Irrigation; 533 - Pumping Plant; 342 - Critical Area Planting; 382 - Fencing

**Before Situation:**

An impervious surface currently exists, but there is no storage available. Water is not available in sufficient quantity or at the required times to provide for wildlife, livestock watering, irrigation, or for other conservation practices. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock, wildlife and or other conservation practices; where water is not available in sufficient quantities at specific locations; and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

An 89,000 gallon storage tank constructed using a bottomless steel tank with a liner is installed with all tank materials, tank plumbing and float valve and other miscellaneous components is installed to collect water from an impervious surface. Tank will provide adequate water storage capacity to ensure against inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, water quantity, crops, and undesirable plant productivity and health.

**Feature Measure:** Gallons of Tank Storage Capacity

**Scenario Unit::** Gallon

**Scenario Typical Size:** 89,000.0

**Scenario Total Cost:** $113,692.38

**Scenario Cost/Unit:** $1.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 20 | $1,100.60 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 120 | $3,408.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 17 | $461.04 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 24 | $1,134.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 10.6 | $297.97 |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $80.05 | 1 | $80.05 |
| Tank, Galvanized Steel Bottomless w/liner Livestock, > 6,000 gallon | 1072 | Includes tank materials, shipping, and float valve, no liner | Gallon | $1.20 | 89000 | $106,800.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 12.2 | $239.61 |

**Practice:** 638 - Water and Sediment Control Basin

**Scenario** #1 - Embankment

**Scenario Description:**

Typical scenario is for the construction of 700 CY earthen embankment. Outlet is typically an underground outlet. An earthen embankment or combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. Work is done with dozer, scraper, or road grader. Costs include all equipment necessary to excavate, shape, grade and compact the Water and Sediment Control Basin and mobilization of equipment. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices.

**Before Situation:**

Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over time. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport. Resource concern addressed includes soil erosion and water quality by trapping sediment and/or reduce erosion in a field to protect riparian areas and water bodies from sediment deposition. Surface water causes erosion and the sediment (and potentially pesticides) to be transported into the riparian areas and water bodies downstream.

**After Situation:**

Water and Sediment Control Basin is constructed with 700 CY of excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. Include Underground Outlet (620) or Structure for Water Control (587) as appropriate to control inflow and outflows. Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** CY of WASCOB Embankment

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 700.0

**Scenario Total Cost:** $3,604.83

**Scenario Cost/Unit:** $5.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 700 | $3,059.00 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 638 - Water and Sediment Control Basin

**Scenario** #2 - Embankment, Topsoil Stockpiled

**Scenario Description:**

Typical scenarios for the construction of 700 CY earthen embankment. Prior to building the embankment, 6 inches of topsoil is removed and stockpiled. Outlet is typically an underground outlet. An earthen embankment or combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. Topsoil is replaced following construction of the embankment. Costs include all equipment necessary to strip and stock pile topsoil, excavate, shape, grade and compact the Water and Sediment Control Basin, spread and replace topsoil after construction and mobilization of equipment. Seeding not included. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices. Work is done with dozer, scraper, or road grader.

**Before Situation:**

Site has shallow topsoil which, if removed by earthwork for construction of embankment, will significantly impact yields. Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over time. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport. Resource concern addressed includes soil erosion and water quality by trapping sediment and/or reduce erosion in a field to protect riparian areas and water bodies from sediment deposition. Surface water causes erosion and the sediment (and potentially pesticides) is being transported into the riparian areas and water bodies downstream.

**After Situation:**

Water and Sediment Control Basin is constructed with 700 CY of excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. Include Underground Outlet (620) or Structure for Water Control (587) as appropriate to control inflow and outflows. Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** CY of WASCOB Embankment

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 700.0

**Scenario Total Cost:** $3,813.63

**Scenario Cost/Unit:** $5.45

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.37 | 700 | $3,059.00 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.87 | 240 | $208.80 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 638 - Water and Sediment Control Basin

**Scenario** #3 - Excavated basin

**Scenario Description:**

An excavated water and sediment control basin in an existing drainage way on a farm for purpose of trapping sediment and preserving the capacity of reservoirs, ditches, canals, diversions, waterways and streams and to prevent undesirable deposition on bottom lands and other developed lands. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices. The basin is created solely by excavation. Excavated material is spoiled, not placed in a designed embankment. Earthen spillway is constructed as needed. Resource concerns addressed include excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Surface water causes the sediment (and potentially pesticides and nutrients) to be transported into the riparian areas and water bodies downstream. Outlets can be underground outlets, pipe drop structures, soil infiltration, stabilized channels or combination. Work is done with dozer, scraper, or road grader. Costs include all equipment necessary to excavate, shape, grade and compact the Water and Sediment Control Basin and mobilization of equipment.

**Before Situation:**

Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over time. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport. Resource concern addressed includes soil erosion and water quality by trapping sediment and/or reduce erosion in a field to protect riparian areas and water bodies from sediment deposition. Surface water causes erosion and the sediment (and potentially pesticides) to be transported into the riparian areas and water bodies downstream.

**After Situation:**

The typical sediment basin is constructed by excavating 120 cubic yards and spreading the spoil outside the pool area using small tractors with front-end-loaders and farm trucks for hauling, or similar machinery. Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342) and Mulching (484) where necessary to prevent erosion following construction activities. Rill and/or gully erosion is reduced. Include Underground Outlet (620) or Structure for Water Control (587) as appropriate to control inflow and outflows.

**Feature Measure:** Excavated volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $1,460.30

**Scenario Cost/Unit:** $12.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 120 | $277.20 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 120 | $430.80 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 3 | $503.01 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 642 - Water Well

**Scenario** #1 - Dug Well

**Scenario Description:**

Typical construction is for the excavation of a shallow dug well. The purpose of the practice is to provide water for livestock. A typical dug well is 4 foot in diameter and 15 feet in depth. The well is excavated using a backhoe. Excavate to a depth where the water recharge is greater than the equipment can remove. Washed gravel is placed in the base of the dug opening. Concrete manhole risers are installed to hold the water. Pea gravel is placed above the washed gravel to transition to the earth backfill. The hole is backfilled and sloped to direct surface water away from entering the manhole cover.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source.

**After Situation:**

Sufficient water is available for livestock. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $16,277.30

**Scenario Cost/Unit:** $16,277.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 10 | $550.30 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 11 | $312.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 11 | $441.76 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 3 | $85.47 |
| Manhole, 4' x 4' | 1053 | Precast Manhole with base and top delivered. 4' diameter x 4' depth. Materials only. | Each | $1,781.20 | 5 | $8,906.00 |
| Aggregate, gravel, washed, pea gravel | 1331 | Washed and graded pea gravel river stone. Includes materials and local delivery within 20 miles of quarry. | Cubic Yard | $31.41 | 1 | $31.41 |
| Grout, cement | 1333 | Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place. | Cubic Yard | $814.22 | 7 | $5,699.54 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.82 | 0.4 | $1.13 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 642 - Water Well

**Scenario** #2 - Drilled, <200 feet deep

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 200 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or frost protection. The representative well depth is 150 feet with 6" diameter PVC casing. Scenario assumes 100 feet of blank casing and 50 feet of perforated casing/plastic screen.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source. Water source other than direct diversions from fisheries stream required for frost protection.

**After Situation:**

Sufficient water is available for livestock or frost protection. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $13,373.47

**Scenario Cost/Unit:** $13,373.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Rotary Drill Rig | 1595 | Rotary drill rig including equipment and power unit costs. Labor not included. | Hour | $333.23 | 15 | $4,998.45 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 30 | $852.00 |
| **Materials** | | | | | | |
| Well Casing, Plastic, 6" | 1804 | PVC or ABS non-threaded well casing, 6". Materials only. | Foot | $6.64 | 100 | $664.00 |
| Test, Pump Test | 1817 | High-volume pumping of well for at least 24 hours. Labor and equipment. | Each | $5,934.02 | 1 | $5,934.02 |
| Well Screen, plastic, 6" | 1999 | 6" PVC well screen. Materials only. | Foot | $18.50 | 50 | $925.00 |

**Practice:** 642 - Water Well

**Scenario** #3 - Drilled, 200-400 feet deep

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 400 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or frost protection. An average well depth is 300 feet with 6" diameter PVC casing. Scenario assumes 250 feet of blank casing and 50 feet of perforated casing/plastic screen.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source. Water source other than direct diversions from fisheries stream required for frost protection.

**After Situation:**

Sufficient water is available for livestock or frost protection. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $20,219.92

**Scenario Cost/Unit:** $20,219.92

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Rotary Drill Rig | 1595 | Rotary drill rig including equipment and power unit costs. Labor not included. | Hour | $333.23 | 30 | $9,996.90 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 60 | $1,704.00 |
| **Materials** | | | | | | |
| Well Casing, Plastic, 6" | 1804 | PVC or ABS non-threaded well casing, 6". Materials only. | Foot | $6.64 | 250 | $1,660.00 |
| Test, Pump Test | 1817 | High-volume pumping of well for at least 24 hours. Labor and equipment. | Each | $5,934.02 | 1 | $5,934.02 |
| Well Screen, plastic, 6" | 1999 | 6" PVC well screen. Materials only. | Foot | $18.50 | 50 | $925.00 |

**Practice:** 642 - Water Well

**Scenario** #4 - Drilled, >800 feet deep

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur at depths exceeding 800 feet. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or frost protection. An average well depth is 1000 feet with 6" diameter PVC casing. Scenario assumes 800 feet of blank casing and 200 feet of perforated casing/plastic screen.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source. Water source other than direct diversions from fisheries stream required for frost protection.

**After Situation:**

Sufficient water is available for livestock or frost protection. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $52,763.02

**Scenario Cost/Unit:** $52,763.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Rotary Drill Rig | 1595 | Rotary drill rig including equipment and power unit costs. Labor not included. | Hour | $333.23 | 100 | $33,323.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 200 | $5,680.00 |
| **Materials** | | | | | | |
| Well Casing, Plastic, 6" | 1804 | PVC or ABS non-threaded well casing, 6". Materials only. | Foot | $6.64 | 900 | $5,976.00 |
| Test, Pump Test | 1817 | High-volume pumping of well for at least 24 hours. Labor and equipment. | Each | $5,934.02 | 1 | $5,934.02 |
| Well Screen, plastic, 6" | 1999 | 6" PVC well screen. Materials only. | Foot | $18.50 | 100 | $1,850.00 |

**Practice:** 642 - Water Well

**Scenario** #59 - Drilled, 401-800 feet deep

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 800 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or frost protection. The representative well depth is 600 feet with 6" diameter PVC casing. Scenario assumes 550 feet of blank casing and 50 feet of perforated casing/plastic screen.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source. Water source other than direct diversions from fisheries stream required for frost protection.

**After Situation:**

Sufficient water is available for livestock or frost protection. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $33,912.82

**Scenario Cost/Unit:** $33,912.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Rotary Drill Rig | 1595 | Rotary drill rig including equipment and power unit costs. Labor not included. | Hour | $333.23 | 60 | $19,993.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 120 | $3,408.00 |
| **Materials** | | | | | | |
| Well Casing, Plastic, 6" | 1804 | PVC or ABS non-threaded well casing, 6". Materials only. | Foot | $6.64 | 550 | $3,652.00 |
| Test, Pump Test | 1817 | High-volume pumping of well for at least 24 hours. Labor and equipment. | Each | $5,934.02 | 1 | $5,934.02 |
| Well Screen, plastic, 6" | 1999 | 6" PVC well screen. Materials only. | Foot | $18.50 | 50 | $925.00 |

**Practice:** 643 - Restoration of Rare or Declining Natural Communities

**Scenario** #1 - Habitat Monitoring and Management, Low Intensity and Complexity

**Scenario Description:**

This scenario is applied to all landuse types where the native plant condition (i.e. T&E plant species) or wildlife habitat is the resource concern, and where low intensity and complexity of monitoring or management will treat the identified resource concern. Rare and declining habitats include estuary, stream, streambank, riparian, vernal pools, prairies or other State identified priority habitats that do not fall under 644 or 645. Only 1-2 monitoring efforts are needed and each requiring less than 2 people and 4 hours per effort. The adaptive management actions such as cutting of limbs that are impeding access of birds into nest boxes, replacing damaged fence markers, cleaning of nest structures and debris around other structures requires only hand labor and less than 16 hours of labor per year on a typical land unit of 40 acres.

**Before Situation:**

Rare or declining habitat is deficient and annual monitoring and adaptive management actions of low intensity and complexity will improved conditions.

**After Situation:**

Rare and declining habitat is improved by implementation of annual adaptive management actions of low intensity and complexity.

**Feature Measure:** Hours needed for monitoring and

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $746.74

**Scenario Cost/Unit:** $18.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 2 | $8.58 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 3 | $64.17 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** 643 - Restoration of Rare or Declining Natural Communities

**Scenario** #2 - Rare or Declining Habitat Monitoring and Management, Medium Intensity and Complexity

**Scenario Description:**

This scenario is applied to all landuse types where the native plant condition (i.e. T&E plant species) or wildlife habitat is the resource concern, and where medium intensity and complexity of monitoring or management will treat the identified resource concern. Rare and declining habitats include stream, streambank, riparian, pond, or other similar areas that do not fall under 644 or 645. Two or three monitoring efforts are needed and each requiring less than 2 people and less than 8 hours per effort. Two or three adaptive management efforts are required (such as cutting of limbs that impede monitoring efforts, replacing damaged fence markers, maintaining nest boxes, or other minor adaptive management activities). The adaptive mgmt. requires hand labor and the occasional use of light equipment. A crew of 2 is needed for the hand labor efforts and the crew will require less than 16 total hours of labor per mgmt. effort on a land unit of 40 acres. Mowing of roads and trail is required to provide access for monitoring and management.

**Before Situation:**

Rare or declining habitat is deficient due to the absence of annual monitoring and adaptive management actions of medium intensity and complexity.

**After Situation:**

Rare or declining habitat is improved by implementation of annual adaptive management actions of medium intensity and complexity.

**Feature Measure:** Hours needed for monitoring and

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $2,011.40

**Scenario Cost/Unit:** $50.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 4 | $17.16 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 1.5 | $76.44 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1.5 | $40.68 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 10 | $1,129.70 |

**Practice:** 643 - Restoration of Rare or Declining Natural Communities

**Scenario** #3 - Habitat Monitoring and Management, High Intensity and Complexity

**Scenario Description:**

This scenario is applied to all landuse types where the native plant condition (i.e. T&E plant species) or wildlife habitat is the resource concern, and where low intensity and complexity of monitoring or management will treat the identified resource concern. Rare and declining habitats include stream, streambank, riparian, pond, or other similar areas that do not fall under 644 or 645. In most cases, client is working with partner natural resource specialists in most cases to evaluate and summarize data for adaptive management. Two - four monitoring efforts are needed and each requiring 2 people and less than 8 hours per effort. Monitoring of native plant response and/or associated wildlife usage. The adaptive management actions (2 - 5 efforts) such as cutting of limbs that are impeding access of wildlife into important habitat areas, maintenance of desirable plant communities, replacing/fixing damaged wildlife structures, cleaning of nest structures and debris around other structures requires hand labor and light equipment, requiring a 2-person crew less than 1 day per effort. Typical land unit size is 40 acres.

**Before Situation:**

Rare or declining habitat is deficient due to the absence of annual monitoring and adaptive management actions of high intensity and complexity.

**After Situation:**

Rare or declining habitat is improved by implementation of annual adaptive management actions of high intensity and complexity.

**Feature Measure:** Hours needed for monitoring and

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $4,199.53

**Scenario Cost/Unit:** $104.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 8 | $34.32 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 7 | $149.73 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 1.5 | $76.44 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1.5 | $40.68 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 24 | $2,711.28 |

**Practice:** 643 - Restoration of Rare or Declining Natural Communities

**Scenario** #10 - Shell Substrate

**Scenario Description:**

Improve near-shore substrate in saline environments for endangered native shellfish species. Shell from non-native shellfish is deposited on the substrate of the water body in order to provide locations for natural seeding and growth of native oyster spat. Activity occurs in areas where past activity has reduced the quantity and quality of the substrate. In addition, the activity will occur in areas where fisheries professionals have pre-determined native oyster spat to occur in the water column. Resource Concern addressed: habitat degradation

**Before Situation:**

Saline environments where native substrate has been degraded due to past dredging, fill, or sedimentation. Oyster spat exists in the water column in sufficient quantities but there is limited opportunity for native oyster spat to colonize existing substrate.

**After Situation:**

Enhanced opportunity for native shellfish species to recolonize local saline environments. Shellfish concentrations increase available food source and cover for many aquatic species, including salmonid, forage fish, and other marine invertebrates. Activity is for the placement of 150 CuYds of clean oyster shell.

**Feature Measure:** CuYds of Shell Substrate Placed

**Scenario Unit::** Each

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $20,716.06

**Scenario Cost/Unit:** $138.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 4 | $246.36 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 12 | $525.36 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 5400 | $1,728.00 |
| Boat, 150 HP | 2407 | 22 foot boat with 150hp motor used to place cultch to create reef habitat. | Hour | $177.27 | 10 | $1,772.70 |
| Barge with crane and operator | 2408 | Barge to transport and place 1 ton bags of cultch to form oyster reef habitat. | Hour | $383.86 | 26 | $9,980.36 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 18 | $722.88 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 10 | $1,129.70 |
| **Materials** | | | | | | |
| Cultch | 2409 | Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only. | Ton | $68.97 | 60 | $4,138.20 |

**Practice:** 643 - Restoration of Rare or Declining Natural Communities

**Scenario** #11 - Seeded Cultch Oyster Placement

**Scenario Description:**

This scenario is for the restoration of endangered native oysters. The activity that will occur will be the placement of genetically tested, seeded cultch bagged oysters produced at a hatchery facility and brought onto the restoration site, broken open, and scattered throughout the footprint of the restoration area onto existing substrate. Site conditions will be evaluated to determine the number of cultch bags needed to be placed. Note: If substrate is also needed, use the combined scenario to place both the shell substrate and the seed oysters bags. Resource Concern: Habitat degradation

**Before Situation:**

Native oysters are endangered by over-harvesting and from pollution from dredging, fill, and sedimentation from a variety of sources. Substrates have an abundance of silt buildup that smothers the oysters. Typical site is an intertidal area where native oysters were historically found, but have been depleted to the point that the population is insufficient to recover the species.

**After Situation:**

Populations of native oysters will be healthy enough numbers to allow spawning and reproduction of the species within the area of restoration and the surrounding areas. These sites are seen as a seed bank that will allow enough numbers of oysters to thrive and replicate areas that had none to remnant populations. Activity is for the release of 200 bags of seeded native oyster cultch onto existing substrate.

**Feature Measure:** Number of Seeded Cultch Bags pla

**Scenario Unit::** Each

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $30,682.32

**Scenario Cost/Unit:** $153.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Boat, 150 HP | 2407 | 22 foot boat with 150hp motor used to place cultch to create reef habitat. | Hour | $177.27 | 16 | $2,836.32 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 40 | $4,518.80 |
| **Materials** | | | | | | |
| Hatchery Seed Oysters | 2635 | Hatchery produced oyster seed with spat grown to 1" to 2" for Oyster Reef Restoration. Component unit "Each" refers to 1,000 count. Includes materials and shipping from hatchery to dockside. | Each | $3.85 | 6000 | $23,100.00 |

**Practice:** 643 - Restoration of Rare or Declining Natural Communities

**Scenario** #12 - Seeded Oysters Bags and Shell Substrate Placement

**Scenario Description:**

Fisheries professionals have pre-determined native oyster spat does not occur in the water column in sufficient quantities and the shell substrate is insufficient for repopulation. Cultch bags of genetically tested, seeded native oysters will be distributed in the water column and allowed to grow to a more mature stature. Afterwards, shell substrate will be hauled in and placed to provide locations for growth of the native oyster spat. Finally, the cultch bags will be broken open and the more matured oyster spat will be distributed over the substrate. Activity is not completed until both the oyster spat and the shell substrate is placed. Resource Concern addressed: Habitat degradation

**Before Situation:**

Saline environments where native substrate has been degraded due to past dredging, fill, or sedimentation and populations of native oysters are diminished. Limited opportunity for native oyster spat to colonize existing substrate.

**After Situation:**

Enhanced opportunity for native shellfish species to recolonize local saline environments. Shellfish concentrations increase available food source and cover for many aquatic species, including salmonid, forage fish, and other marine invertebrates. Activity is for the placement of 200 cultch bags of seeded, genetically tested native oysters followed later by the placement of 150 CuYds of clean oyster shell.

**Feature Measure:** Seeded Cultch Bags placed

**Scenario Unit::** Each

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $51,049.78

**Scenario Cost/Unit:** $255.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 4 | $446.64 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.32 | 5400 | $1,728.00 |
| Boat, 150 HP | 2407 | 22 foot boat with 150hp motor used to place cultch to create reef habitat. | Hour | $177.27 | 26 | $4,609.02 |
| Barge with crane and operator | 2408 | Barge to transport and place 1 ton bags of cultch to form oyster reef habitat. | Hour | $383.86 | 26 | $9,980.36 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 16 | $642.56 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 50 | $5,648.50 |
| **Materials** | | | | | | |
| Cultch | 2409 | Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only. | Ton | $68.97 | 60 | $4,138.20 |
| Hatchery Seed Oysters | 2635 | Hatchery produced oyster seed with spat grown to 1" to 2" for Oyster Reef Restoration. Component unit "Each" refers to 1,000 count. Includes materials and shipping from hatchery to dockside. | Each | $3.85 | 6000 | $23,100.00 |

**Practice:** 643 - Restoration of Rare or Declining Natural Communities

**Scenario** #21 - Plug Planting, <= 0.5 ac.

**Scenario Description:**

This practice scenario involves the establishment of permanent native aquatic and emergent herbaceous vegetation to restore the characteristic wetland plant community to the site. Typical size of the practice is 0.5 acres or less. Plug plantings are typically applied in sensitive areas or when there is a low seeding success rate. Prepare a firm, weed free seedbed so that proper stand establishment is ensured. Once the seedbed has been prepared, plugs of native species are planted by hand on 1.5' spacing. Practice applicable on native prairies, or on riparian areas, lacustrine fringes, palustrine depressional areas, wet areas on cropland, and other areas where wetland hydrology exists or will be restored. Resource concern addressed is inadequate fish and wildlife habitat. This scenario may only be contracted with approval of the state/area biologist or their representative.

**Before Situation:**

Area may have previously been converted from wetland to another use or plants on the site are in a degraded condition providing little or no habitat value for fish or wildlife.

**After Situation:**

This typical 0.5 acre is established to permanent native vegetation to restore wetland. Land restored to natural wetland habitat including a mix of native and/or plants adapted to living in saturated and inundated soils with seasonal inundation. Aquatic or terrestrial ecosystems have been improved on the site and provide habitat for fish and wildlife.

**Feature Measure:** Acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $13,430.80

**Scenario Cost/Unit:** #Div/0!

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 23 | $653.20 |
| **Materials** | | | | | | |
| Native Aquatic Plants, Emergent or Submerged | 2336 | Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping. | Each | $1.32 | 9680 | $12,777.60 |

**Practice:** 643 - Restoration of Rare or Declining Natural Communities

**Scenario** #40 - Post Line-Wicker Weave

**Scenario Description:**

A bioengineering structure consisting of wooden posts set in a row across stream channels or gullies with willow cuttings woven between the posts (also called, Beaver Dam Analogues or Wicker Weirs). Structures can be installed by a small crew by hand using post pounder. The structure is designed to mimic the function of natural beaver dams by reducing water velocities, increasing sediment deposition, initiating aggradation, and enhancing floodplain connectivity. It is low and permeable allowing water to pass over and through it helping to gradually raise the channel bed and encourage more frequent floodplain inundation. These structures are used to restore hydrologic function, channel complexity, and encourage recovery/expansion of riparian and wetland vegetation. Addresses resource concerns in rare and declining habitats including riparian areas, wet meadows, and aquatic ecosystems.

**Before Situation:**

Degraded stream channel or gully has accelerated flow, reduced sediment deposition, and infrequent floodplain access. Extent of potential mesic vegetation is reduced due to lack of inundation or low water table. Channel complexity is insufficient to permit proper hydrologic function and riparian/wetland recovery.

**After Situation:**

Reduced water velocities, increased sediment deposition, channel aggradation, and enhanced floodplain connectivity result in an expansion of mesic vegetation and restoration of rare and declining habitats including riparian areas, wet meadows, and aquatic ecosystems benefiting a variety of species.

**Feature Measure:** Linear Feet of Structure

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $584.11

**Scenario Cost/Unit:** $19.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 2 | $55.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 6 | $170.40 |
| **Materials** | | | | | | |
| Lumber, planks, posts and timbers, untreated, rot resistant | 1612 | Untreated dimension lumber with nominal thickness greater than 2" milled from rot resistant species such as cedar. Includes lumber and fasteners. Does not include labor. | Board Foot | $2.44 | 95 | $231.80 |
| Wattles or facines, 6 to 8 inch diameter | 1904 | Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 6"-8" diameter. Includes materials and shipping only. | Foot | $7.00 | 15 | $105.00 |

**Practice:** 643 - Restoration of Rare or Declining Natural Communities

**Scenario** #41 - Rock Structure

**Scenario Description:**

A low cost, low risk rock structure will be installed at the head of the gully to arrest the continued cutting of the gully up hill. The structure is designed to protect the soil surface from further erosion while dissipating water energy. Below the headcut structure a series of structures will be installed to reduce water velocity and cause deposition of sediments to heal the gully and reduce drainage from the adjacent upland area. This will reduce the loss of and restore mesic riparian/meadow habitats. Typical installation involves the installation of one structure to address head-cutting and three additional structures to reduce stream velocity and collect sediment. The headcut structure typically requires 1.5 cubic yards of rock. Typical sediment checks require 1.0 cubic yards of rock. This scenario addresses Soil Erosion, classic gully and inadequate fish and wildlife habitat.

**Before Situation:**

Head cutting is proceeding uphill creating a gully that serves as a drain to the adjacent habitat lowering the local water table reducing the available moisture to the adjacent mesic plant communities. Mesic riparian/meadow habitats shift to more xeric habitats and the period of active growth is reduced.

**After Situation:**

Head cut is arrested, stopping the advance of the gully uphill and protecting mesic riparian/meadow habitats upstream. Additionally sediment is collected, raising the base of the gully and restoring the hydrologic regime and mesic riparian/meadow habitats. Revegetation is generally via natural regeneration. Should additional revegetation be needed, use vegetation standards, 612, Tree and shrub establishment, 550, Range Planting, 342 Critical Area Treatment.

**Feature Measure:** Cubic Yards

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $3,241.16

**Scenario Cost/Unit:** $810.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 2 | $55.52 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $56.50 | 8 | $452.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 64 | $1,817.60 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $31.54 | 4.5 | $141.93 |

**Practice:** 643 - Restoration of Rare or Declining Natural Communities

**Scenario** #43 - Beetle Bank

**Scenario Description:**

Beetle banks are berms planted in dense stands of native bunch grasses designed to provide shelter and overwintering habitat for beetles, spiders and other beneficial insects that attack crop pests and weeds. They are generally 3ft to 6ft in width, and positioned in the center of, or at regular intervals throughout, crop fields.

**Before Situation:**

The structures are targeted for areas, such as tilled crop fields, that lack sufficient overall habitat conditions to support viable populations of targeted species.

**After Situation:**

The installation of a beetle bank supports the habitat requirements of beetles, spiders, and other beneficial insects that attack crop pests in agricultural fields.

**Feature Measure:** Length of Bank

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 750.0

**Scenario Total Cost:** $2,117.78

**Scenario Cost/Unit:** $2.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 0.1 | $1.63 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 0.4 | $8.06 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.2 | $2.47 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 2 | $48.64 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 10 | $637.10 |
| **Foregone Income** | | | | | | |
| FI, Vegetables | 2033 | Vegetables is Primary Crop | Acre | $1,111.11 | 0.1 | $111.11 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 2 | $54.24 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 7 | $330.75 |
| **Materials** | | | | | | |
| Herbicide, 2,4-D | 330 | Broadleaf herbicide labeled for cropland and pasture. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $9.42 | 0.2 | $1.88 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 0.3 | $5.66 |
| Mulching, straw or hay | 1214 | Use of straw or hay for temporary ground cover. Includes application and methods necessary to keep in place such as tacking or crimping. Includes materials, equipment and labor. | Acre | $3,636.73 | 0.1 | $363.67 |
| Three Species Mix, Cool Season, Native Perennial Grass | 2316 | Cool season, native grass mix. Includes material and shipping only. | Acre | $139.51 | 0.2 | $27.90 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 4 | $275.36 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #1 - Habitat Monitoring and Management, Low Intensity and Complexity

**Scenario Description:**

This scenario is applied to wetlands within all landuse types including those with wildlife as a modifier, where any resource concern is identified for wildlife, and where low intensity and complexity of monitoring or management will treat the identified resource concern. Only 1-2 monitoring efforts are needed and each requiring less than 2 people and 4 hours per effort. The adaptive management actions such as cutting of limbs that are impeding access of birds into nest boxes, replacing damaged fence markers, cleaning of nest structures and debris around other structures requires only hand labor and less than 16 hours of labor per year on a typical land unit of 40 acres.

**Before Situation:**

Wetland wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of very-low intensity and complexity.

**After Situation:**

Wetland wildlife habitat is improved by implementation of annual adaptive management actions of very- low intensity and complexity.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $493.03

**Scenario Cost/Unit:** $12.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 2 | $8.58 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 3 | $64.17 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 13 | $369.20 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #2 - Habitat Monitoring and Management, Medium Intensity and Complexity

**Scenario Description:**

This scenario is applied to wetland areas located on all landuse types including those with wildlife as a modifier, where any resource concern is identified for wildlife, and where medium intensity and complexity of monitoring or management will treat the identified resource concern. Two or three monitoring efforts are needed and each requiring less than 2 people and less than 8 hours per effort. Two or three adaptive management efforts are required (such as cutting of limbs that are impeding access of birds into nest boxes, replacing damaged fence markers, maintaining nest boxes, removing debris around other structures, etc.). The adaptive mgmt. requires hand labor and the occasional use of light equipment. A crew of 2 is needed for the hand labor efforts and the crew will require less than 16 total hours of labor per mgmt. effort on a land unit of 40 acres. Mowing of roads and trail is required to provide access for monitoring and management.

**Before Situation:**

Wetland wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of medium intensity and complexity.

**After Situation:**

Wetland wildlife habitat is improved by implementation of annual adaptive management actions of medium intensity and complexity.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $881.70

**Scenario Cost/Unit:** $22.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 4 | $17.16 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 1.5 | $76.44 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1.5 | $40.68 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #3 - Habitat Monitoring and Management, High Intensity and Complexity

**Scenario Description:**

This scenario is applied to all landuse types including those with wildlife as a modifier, where any resource concern is identified for wildlife, and where high intensity and complexity of monitoring or management will treat the identified resource concern. In most cases, client is working with partner natural resource specialists in most cases to evaluate and summarize data for adaptive management. Two - four monitoring efforts are needed and each requiring 2 people and less than 8 hours per effort. Monitoring of native plant response and/or associated wildlife usage. The adaptive management actions (2 - 5 efforts) such as cutting of limbs that are impeding access of wildlife into important habitat areas, maintenance of desirable plant communities, replacing/fixing damaged wildlife structures, cleaning of nest structures and debris around other structures requires hand labor and light equipment, requiring a 2-person crew less than 1 day per effort. Typical land unit size is 40 acres.

**Before Situation:**

Wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of high intensity and complexity.

**After Situation:**

Wildlife habitat is improved by implementation of annual adaptive management actions of high intensity and complexity.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $4,354.93

**Scenario Cost/Unit:** $108.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 4 | $446.64 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 8 | $34.32 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 7 | $149.73 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 1.5 | $76.44 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1.5 | $40.68 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 20 | $2,259.40 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #4 - Water Level Drawdown, Low Intensity

**Scenario Description:**

The resource concern is addressed by providing shallow water habitat for wildlife such as sandhill cranes, shorebirds, waterfowl, wading birds, mammals, fish, reptiles, amphibians, and other species that require shallow water for at least part of their life cycle. Water control outlet structures are closed, tillage smooths soils surface, and fields are fall/winter flooded up to a depth of 18" with an average depth of 9". Water is then maintained by natural flooding and/or precipitation. In spring, water control structures are removed gradually over the course of 4 weeks to provide critical habitat. The "low" intensity scenario does not require any supplemental artificial floodwater. Resource Concerns: Inadequate Habitat for Fish and Wildlife, Excess/Insufficient Water

**Before Situation:**

There is inadequate habitat to provide optimum resting, nesting, and feeding habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.).

**After Situation:**

A single or series of shallow water areas that are managed per standard and specification. Water levels are regulated to maintain temporary wildlife habitat. Timing and duration of flooding and de-watering is dependent on specific species requirements. Water is pumped into area to be flooded. Flooded sites vary from mudflats to water depths of 18" with an average depth of 9". The hydrologic conditions of ponding and saturation (frequency, depth, duration, timing) provides optimum seasonal habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.). If dikes or water control structures are not currently present on the fields planned to be flooded, these practices may be planned under Structure for Water Control (587), Dike (356), and Pumping Plant (533). Depending on local conditions, other Conservation Practices may also be required.

**Feature Measure:** Acre of shallow water

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,127.90

**Scenario Cost/Unit:** $21.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 10 | $213.90 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 100 | $1,630.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #5 - Water Management, High Intensity

**Scenario Description:**

Seasonal shallow water is provided for target species by maintaining a specified water depth for a prescribed duration. Sites are flooded and desired water level is then maintained by natural flooding and/or precipitation PLUS artificial flooding as needed to maintain the target water level throughout the critical habitat period. In spring, water is removed gradually over the course of 4-8 weeks to provide critical mud flat habitat. This high-level management is applied to all lands where very specific conditions needed to address previously identified degraded plant conditions or inadequate habitat for fish and/or wildlife have been identified as a primary concern. For rice, fields are flooded immediately post-harvest and water depth is managed at 4-18 inches until at least February 1st. For other cropland, water is managed for a depth of 2-10 inches; fields are flooded for a minimum of 60 days between September 15th and March 15th. Facilitating practices may include Structure for Water Control (587), Pumping Plant (533), Dike (356), or other habitat management practices (643, 645, 657). Resource Concerns: Inadequate Habitat for Fish and Wildlife, Excess/Insufficient Water

**Before Situation:**

The site has a reliable water source and some existing infrastructure to provide seasonal water, but current management does not provide optimal water depth, frequency, or duration for target species. The potential benefits to target fauna and flora is not being captured. The purchase of water, supply of water and intensive management of season water, coupled with monitoring, adaptive management from highly trained individuals will fully address the identified degraded plant conditions and/or inadequate habitat for fish and/or wildlife.

**After Situation:**

A single or series of shallow water areas that are managed per standard and specification. Water levels are regulated to maintain temporary wildlife habitat. Timing and duration of flooding and de-watering is dependent on specific species requirements. Water is pumped into area to be flooded. Flooded sites vary from mudflats to water depths of 12" with an average depth of 6". The hydrologic conditions of ponding and saturation (frequency, depth, duration, timing) provides optimum seasonal habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.).

**Feature Measure:** Acre of shallow water

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $6,907.40

**Scenario Cost/Unit:** $69.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 10 | $213.90 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 30 | $6,409.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #6 - Seasonal Flooding

**Scenario Description:**

Seasonal Flooding is the application of water to fallow fields or fields that were already harvested. In this scenario, fields are flooded for a minimum of 30 days between August 15th and October 1 (fall) or between April 1 and July 15 (spring). If applied in the fall, this creates shallow water habitat (1-4 inches) for early fall migratory birds that are returning from the breeding grounds to the north. If applied in the spring/summer months, this provides nesting and brood-rearing habitats for local nesting shorebirds and waterfowl.

**Before Situation:**

The site has a reliable water source and some existing infrastructure to provide seasonal water, but current management does not provide optimal water depth or duration during critical periods. The potential benefits to target fauna and flora is not being captured.

**After Situation:**

Water levels are regulated to provide temporary wildlife habitat during the critical period. Timing and duration of flooding and de-watering is dependent on specific species requirements. Flooded sites vary from mudflats to water depths of 6" with an average depth of 3". The hydrologic conditions of ponding and saturation (frequency, depth, duration, timing) provides optimum seasonal habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.).

**Feature Measure:** Acre of shallow water

**Scenario Unit::** Acre

**Scenario Typical Size:** 60.0

**Scenario Total Cost:** $6,494.70

**Scenario Cost/Unit:** $108.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 30 | $6,409.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 3 | $85.20 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #7 - Flooding for Wildlife, Cropland

**Scenario Description:**

Flooding for Wildlife is the application of water to active cropland which removes the land from production. In this scenario, fields are flooded for a minimum of 45 days between August 1st and October 15 (fall) or April 1 and May 15th (spring). Monitoring water delivery via pumps is required everyday for the 45 day period. If applied in the fall, this creates shallow water habitat (1-4 inches) for early fall migrants that are migrating to California and Mexico from the breeding grounds to the north. If applied in the fall, this provides moist soil and shallow water feeding areas . If applied in the spring months, this provides nesting and brood-rearing habitats for local nesting shorebirds and waterfowl. Payment includes field preparation: low berm creation if needed, chop, mow, or light disking only allowed, and mosquito abatement as needed.

**Before Situation:**

The site has a reliable water source and some existing infrastructure to provide seasonal water, but current management does not provide optimal water depth or duration during critical periods. The potential benefits to target fauna and flora is not being captured.

**After Situation:**

Water levels are regulated to provide temporary wildlife habitat during the critical period. Timing and duration of flooding and de-watering is dependent on specific species requirements. Flooded sites vary from mudflats to water depths of 6" with an average depth of 3". The hydrologic conditions of ponding and saturation (frequency, depth, duration, timing) provides optimum seasonal habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.).

**Feature Measure:** Acre of shallow water

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $27,773.20

**Scenario Cost/Unit:** $1,388.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 20 | $4,273.00 |
| **Foregone Income** | | | | | | |
| FI, Vegetables | 2033 | Vegetables is Primary Crop | Acre | $1,111.11 | 20 | $22,222.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 45 | $1,278.00 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #8 - Flooding for Wildlife, Grassland/pasture/hayland

**Scenario Description:**

Seasonal Floodup is the application of water to existing grassland fields, either pasture or hayland, which is removed from production for a full year in order to hold water on the field during both fall and spring migration. In this scenario, fields are flooded for a minimum of 45 days between August 1st and October 15 (fall) or April 1 and May 15th (spring). Monitoring water delivery via pumps is required everyday for the 45 day period. If applied in the fall, this creates shallow water habitat (1-4 inches) for early fall migrants that are migrating to California and Mexico from the breeding grounds to the north. If applied in the fall, this provides moist soil and shallow water feeding areas . Water is held through the following spring months, providing nesting and brood-rearing habitats for local nesting shorebirds and waterfowl. Payment includes field preparation: chop, mow, or light disking, low berm creation, temporary livestock exclusion fence, and mosquito abatement as needed. Pasture re-seeding following shallow water management is cost shared under separate planting practice. Resource Concerns: Inadequate Habitat For Fish and Wildlife, Excess/Insufficient Water

**Before Situation:**

The site has a reliable water source and some existing infrastructure to provide seasonal water, but current management does not provide optimal water depth or duration during critical periods. The potential benefits to target fauna and flora is not being captured.

**After Situation:**

Water levels are regulated to provide temporary wildlife habitat during the critical period. Timing and duration of flooding and de-watering is dependent on specific species requirements. Flooded sites vary from mudflats to water depths of 6" with an average depth of 3". The hydrologic conditions of ponding and saturation (frequency, depth, duration, timing) provides optimum seasonal habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.).

**Feature Measure:** Acre of shallow water

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $7,817.88

**Scenario Cost/Unit:** $390.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 20 | $4,273.00 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 176 | $2,266.88 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 45 | $1,278.00 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #1 - Habitat Monitoring and Management, Low Intensity and Complexity

**Scenario Description:**

This scenario is applied to all landuse types including those with wildlife as a modifier, where any resource concern is identified for wildlife, and where very-low intensity and complexity of monitoring or management will treat the identified resource concern. Only 1-2 monitoring efforts are needed and each requiring less than 2 people and 4 hours per effort. The adaptive management actions such as cutting of limbs that are impeding access of birds into nest boxes, replacing damaged fence markers, cleaning of nest structures and debris around other structures requires only hand labor and less than 16 hours of labor per year on a typical land unit of 40 acres.

**Before Situation:**

Wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of very-low intensity and complexity.

**After Situation:**

Wildlife habitat is improved by implementation of annual adaptive management actions of very- low intensity and complexity.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $493.03

**Scenario Cost/Unit:** $12.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 2 | $8.58 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 3 | $64.17 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 13 | $369.20 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #2 - Habitat Monitoring and Management, Medium Intensity and Complexity

**Scenario Description:**

This scenario is applied to all landuse types including those with wildlife as a modifier, where any resource concern is identified for wildlife, and where medium intensity and complexity of monitoring or management will treat the identified resource concern. Two or three monitoring efforts are needed and each requiring less than 2 people and less than 8 hours per effort. Two or three adaptive management efforts are required (such as cutting of limbs that are impeding access of birds into nest boxes, replacing damaged fence markers, maintaining nest boxes, removing debris around other structures, etc.). The adaptive mgmt. requires hand labor and the occasional use of light equipment. A crew of 2 is needed for the hand labor efforts and the crew will require less than 16 total hours of labor per mgmt. effort on a land unit of 40 acres. Mowing of roads and trail is required to provide access for monitoring and management.

**Before Situation:**

Wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of medium intensity and complexity.

**After Situation:**

Wildlife habitat is improved by implementation of annual adaptive management actions of medium intensity and complexity.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $1,165.70

**Scenario Cost/Unit:** $29.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 4 | $17.16 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 1.5 | $76.44 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 30 | $852.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1.5 | $40.68 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #3 - Habitat Monitoring and Management, High Intensity and Complexity

**Scenario Description:**

This scenario is applied to all landuse types including those with wildlife as a modifier, where any resource concern is identified for wildlife, and where high intensity and complexity of monitoring or management will treat the identified resource concern. In most cases, client is working with partner natural resource specialists in most cases to evaluate and summarize data for adaptive management. Two - four monitoring efforts are needed and each requiring 2 people and less than 8 hours per effort. Monitoring of native plant response and/or associated wildlife usage. The adaptive management actions (2 - 5 efforts) such as cutting of limbs that are impeding access of wildlife into important habitat areas, maintenance of desirable plant communities, replacing/fixing damaged wildlife structures, cleaning of nest structures and debris around other structures requires hand labor and light equipment, requiring a 2-person crew less than 1 day per effort. Typical land unit size is 40 acres.

**Before Situation:**

Wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of high intensity and complexity.

**After Situation:**

Wildlife habitat is improved by implementation of annual adaptive management actions of high intensity and complexity.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $4,354.93

**Scenario Cost/Unit:** $108.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 4 | $446.64 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 8 | $34.32 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 7 | $149.73 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 1.5 | $76.44 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1.5 | $40.68 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 20 | $2,259.40 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #4 - Habitat Monitoring and Management, High Intensity and Complexity With Foregone Income

**Scenario Description:**

This scenario is applied to all landuse types including those with wildlife as a modifier, where any resource concern is identified for wildlife, and where high intensity and complexity of monitoring or management will treat the identified resource concern. Land is being removed from agricultural production to restore as permanent wildlife habitat. Two - four monitoring efforts are needed and each requiring 2 people and less than 8 hours per effort. Monitoring of native plant response and/or associated wildlife usage. The adaptive management actions (2 - 5 efforts) such as cutting of limbs that are impeding access of wildlife into important habitat areas, maintenance of desirable plant communities, replacing/fixing damaged wildlife structures, cleaning of nest structures and debris around other structures requires hand labor and light equipment, requiring a 2-person crew less than 1 day per effort. Typical land unit size is 40 acres.

**Before Situation:**

Wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of high intensity and complexity. Land is currently in agricultural production.

**After Situation:**

Wildlife habitat is improved by implementation of annual adaptive management actions of high intensity and complexity. Land is removed from agricultural production.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $9,104.34

**Scenario Cost/Unit:** $227.61

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 4 | $446.64 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 8 | $34.32 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 7 | $149.73 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 1.5 | $76.44 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $51.08 | 1 | $51.08 |
| **Foregone Income** | | | | | | |
| FI, Oats Dryland | 1969 | Dryland Oats is Primary Crop | Acre | $221.43 | 10 | $2,214.30 |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 6.67 | $85.91 |
| FI, Hay, Alfalfa | 2121 | Alfalfa Hay is Primary Crop | Ton | $40.82 | 60 | $2,449.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1.5 | $40.68 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 20 | $2,259.40 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #5 - Fence Removal for Wildlife

**Scenario Description:**

Removal of 1-2 strands of wire to modify an existing fence to make it wildlife friendly. Removal of second wire from the top or the bottom wire provides for less obstructed movement of wildlife throughout pasture/rangeland. Scenario is based on 1/4 mile of fence to remove 1 strand of wire. Strands will be removed for the entire length between two H-braces to maintain structure/support. For replacement of wires or fence reconstruction use practice for Fence (382) Resource concerns: Inadequate habitat for fish and wildlife--habitat degradation

**Before Situation:**

Wildlife get tangled in the top 2 wires when they are too close together, or in the bottom wire if it is too close to the ground. Fence is having an adverse effect on wildlife movement across corridors.

**After Situation:**

1-2 strands of wire are removed. Restrictions on wildlife passage through corridors is reduced.

**Feature Measure:** Feet of fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,320.0

**Scenario Total Cost:** $49.79

**Scenario Cost/Unit:** $0.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1 | $28.40 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #315 - Establishment of seasonal wildlife forage or cover on cropland, no FI

**Scenario Description:**

This typical scenario occurs on cropland. The habitat assessment identified the need to provide seasonal forage or cover for target wildlife species or guild. This habitat need will be met through the establishment of annual food plants or cover plants by planting of seed. The typical scenario for seasonal forage or cover will be established outside of crop season, thus FI is not needed. Seedbed preparation (light tillage) will be furthered by firming the seed bed by cultipacking the site. The only fertilizer need is N as this is cropland and P and K levels are sufficient. Cropland, so mobilization of equipment not needed.

**Before Situation:**

Cropland that fails to provided food or cover for target species at the proper location and season to meet the needs of wildlife.

**After Situation:**

The availability of high-quality seasonal forage or seasonal cover for the target wildlife species is provided. Target wildlife health is improved and populations are increased.

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,091.60

**Scenario Cost/Unit:** $109.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 10 | $109.40 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 10 | $65.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 10 | $209.70 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 10 | $75.60 |
| **Materials** | | | | | | |
| Nitrogen (N), Ammonium Sulfate | 70 | Price per pound of N supplied by Ammonium Sulfate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.87 | 60 | $52.20 |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 10 | $579.70 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #316 - Establishment of seasonal forage or cover for wildlife on non-cropland.

**Scenario Description:**

The habitat assessment identifies the need to provide seasonal forage or cover for target wildlife species or guild. This habitat need will be met through the establishment of annual plants by planting of seed. The typical scenario is that this activity will occur on herbaceous areas, not currently in cropland. Due to existing dense vegetation, these area will need to be mowed 2-3 weeks prior to disking (primarily disking), then followed by a light disking. Seed bed preparation will be furthered by firming the seed bed by cultipacking the site. Mixed fertilizer is required to establish planted wildlife seasonal forage or seasonal cover..

**Before Situation:**

The existing habitat has an excess of herbaceous perineal habitat, but is lacking high-quality seasonal forage, or the existing cover is too dense and cover conditions found in annual plant communities are absent.

**After Situation:**

The availability of high-quality seasonal forage, or cover condition common in annual plant communities is provided and target wildlife health and populations are increased.

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,602.68

**Scenario Cost/Unit:** $160.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 3 | $152.88 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 20 | $218.80 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 10 | $163.00 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 10 | $65.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 10 | $209.70 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 10 | $75.60 |
| **Materials** | | | | | | |
| Nitrogen (N), Ammonium Sulfate | 70 | Price per pound of N supplied by Ammonium Sulfate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.87 | 100 | $87.00 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 60 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 60 | $24.00 |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 10 | $579.70 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #317 - Interseeding Milkweed Into Existing Habitat

**Scenario Description:**

Inter-seeding milkweed into an existing stand of vegetation that has sufficient nectar plant richness and distribution, but lacks reproductive habitat (milkweed is lacking). Existing vegetation will be treated with herbicides in strips. Entire area will be burned or mowed prior to application of herbicides to 6-10 foot wide strips. Drilling of milkweed will be in the treated (herbicide strips). Seeding in strips will be 25% of the field.

**Before Situation:**

An open field that may support enough forb species richness, abundance and distribution to provide good or excellent monarch nectaring habitat, but milkweed is lacking. These conditions fail to meet the limiting factor for monarchs as required to meet Upland Wildlife Habitat (654) as reproductive habitat is identified as the limiting factor for this species. Application of the Monarch WHEG finds the habitat quality rating to be poor or fair.

**After Situation:**

The open field supports good or excellent monarch reproductive habitat. Application of the Monarch WHEG finds the habitat quality rating to be good or excellent.

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $2,723.73

**Scenario Cost/Unit:** $544.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 5 | $30.10 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 5 | $100.80 |
| Seeding Operation, No Till/Strip Till Planter | 1230 | No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor. | Acre | $18.51 | 5 | $92.55 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1.25 | $23.59 |
| Highly Specialized native grass and forb mix | 2618 | A mix of native grass and forbs to be used for restoration of Monarch butterfly foraging and larva development habitat. Includes material and shipping only. | Acre | $1,981.35 | 1.25 | $2,476.69 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #320 - Pollinator Species, Annuals

**Scenario Description:**

Mix of native grasses, legumes, and forbs established on any land needing annual vegetative cover that provides habitat for pollinators. Typical practice size is variable depending on site; this scenario uses 1 ac as the typical size. In addition to providing pollinator habitat, additional resource benefits may also include reduced sheet, rill, and wind erosion, improved soil quality, water quality, and air quality. Practice applicable on cropland, odd areas, corners, etc. Applies to conventional or organic systems.

**Before Situation:**

Existing vegetation on the property provides very little food, cover, shelter, or ability of wildlife to move safely. There is little diversity of vegetation and flowering pollinator plants are not available in sufficient quantities throughout the year to support pollinator species.

**After Situation:**

Land is covered with suitable pollinator habitat with a mix of native species that includes legumes, forbs (mix may also include a low percentage of non-native species) and possibly grasses. Plants sown for pollinator habitat may also provide cover for beneficial insects and wildlife.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $505.03

**Scenario Cost/Unit:** $505.03

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 3 | $32.82 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Materials** | | | | | | |
| One Species, Native Forb, Moderate/High Cost | 2331 | Native forb. Includes material and shipping only. | Acre | $635.24 | 0.5 | $317.62 |
| Native Grass and Forb Mix, for Wildlife (including pollinators) or Ecosystem Restoration | 2335 | Native grass and forb/legume mix, including specialized species. Includes material and shipping only. | Acre | $252.12 | 0.5 | $126.06 |

**Practice:** 646 - Shallow Water Development and Management

**Scenario** #1 - Flooding for Wildlife, Grassland/pasture/hayland

**Scenario Description:**

Seasonal Floodup is the application of water to existing grassland fields, either pasture or hayland, which is removed from production for a full year in order to hold water on the field during both fall and spring migration. In this scenario, fields are flooded for a minimum of 45 days between August 1st and October 15 (fall) or April 1 and May 15th (spring). Monitoring water delivery via pumps is required everyday for the 45 day period. If applied in the fall, this creates shallow water habitat (1-4 inches) for early fall migrants that are migrating to California and Mexico from the breeding grounds to the north. If applied in the fall, this provides moist soil and shallow water feeding areas . Water is held through the following spring months, providing nesting and brood-rearing habitats for local nesting shorebirds and waterfowl. Payment includes field preparation: chop, mow, or light disking, temporary livestock exclusion fence, and mosquito abatement as needed. Pasture re-seeding following shallow water management is cost shared under separate planting practice. Resource Concerns: Inadequate Habitat For Fish and Wildlife, Excess/Insufficient Water

**Before Situation:**

The site has a reliable water source and some existing infrastructure to create shallow water flooding, but current management does not provide optimal water depth or duration during critical periods. The potential benefits to target fauna and flora is not being captured.

**After Situation:**

Water levels are regulated to provide temporary wildlife habitat during the critical period. Timing and duration of flooding and de-watering is dependent on specific species requirements. Flooded sites vary from mudflats to water depths of 6" with an average depth of 3". The hydrologic conditions of ponding and saturation (frequency, depth, duration, timing) provides optimum seasonal habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.).

**Feature Measure:** Acre of shallow water

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $7,817.88

**Scenario Cost/Unit:** $390.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 20 | $4,273.00 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 176 | $2,266.88 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 45 | $1,278.00 |

**Practice:** 646 - Shallow Water Development and Management

**Scenario** #2 - Flooding for Wildlife, Cropland

**Scenario Description:**

Flooding for Wildlife is the application of water to active cropland which removes the land from production on a temporary basis, typically 1-3 years. In this scenario, fields are flooded for a minimum of 45 days between August 1st and October 15 (fall) or April 1 and May 15th (spring). Monitoring water delivery via pumps is required everyday for the 45 day period. If applied in the fall, this creates shallow water habitat (1-4 inches) for early fall migrants that are migrating to California and Mexico from the breeding grounds to the north. If applied in the fall, this provides moist soil and shallow water feeding areas . If applied in the spring months, this provides nesting and brood-rearing habitats for local waterfowl and other water birds. Payment includes field preparation: chop, mow, or light disking only allowed, and mosquito abatement as needed. Resource Concerns: Inadequate Habitat For Fish and Wildlife, Excess/Insufficient Water

**Before Situation:**

The site has a reliable water source and some existing infrastructure to provide seasonal water, but current management does not provide optimal water depth or duration during critical periods. The potential benefits to target fauna and flora is not being captured.

**After Situation:**

Water levels are regulated to provide temporary wildlife habitat during the critical period. Timing and duration of flooding and de-watering is dependent on specific species requirements. Flooded sites vary from mudflats to water depths of 6" with an average depth of 3". The hydrologic conditions of ponding and saturation (frequency, depth, duration, timing) provides optimum seasonal habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.).

**Feature Measure:** Acre of shallow water

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $27,773.20

**Scenario Cost/Unit:** $1,388.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $213.65 | 20 | $4,273.00 |
| **Foregone Income** | | | | | | |
| FI, Vegetables | 2033 | Vegetables is Primary Crop | Acre | $1,111.11 | 20 | $22,222.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 45 | $1,278.00 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #1 - Wet Soil Herp Habitat

**Scenario Description:**

Mowing wetland/upland transitional habitats to benefit a target reptile or amphibious species when a habitat assessment indicates degraded vegetation habitat for target species. Typical application is for reduction of undesirable herbaceous species such as reed canary grass (Phalaris arundinaceous) or giant cane (Arundo donax). Vegetation management will improve ability of herps to move between wetland habitats, enhance breeding and oviposition locations, prevent egg desiccation, and prevent adult and juvenile isolation from aquatic areas. Typical implementation requires 3 consecutive years of habitat enhancement techniques such as crushing biomass, mowing to ground level, plowing/disking to loosen root mass, and herbicide application. Mowing/crushing is completed with a Marsh Master or equivalent wet soil mower. One treatment consists of implementation of one or more of the above listed habitat enhancement techniques in both early summer and the fall.

**Before Situation:**

Invasive undesirable vegetation is inhibiting the ability of herps to move across wetland habitats and has degraded the breeding habitat. A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a need for vegetation management to bring Inadequate Habitat for Fish or Wildlife up to planning criteria. Wetland habitat limiting factors include quality, quantity and continuity of forage, cover, shelter, space and water availability.

**After Situation:**

Mowing improves plant and animal habitat and reduces invasive and undesirable species. Vegetation biomass and height is managed for optimal habitat conditions. The practice is installed using general labor with minimal supervision or skilled labor without supervision with use of common hand tools and small equipment;

**Feature Measure:** Acres of treated area

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $8,001.03

**Scenario Cost/Unit:** $1,600.21

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 40 | $855.60 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 40 | $2,038.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 10 | $163.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 48 | $1,874.88 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 40 | $1,084.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 40 | $1,890.00 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 5 | $94.35 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #2 - Root Separation

**Scenario Description:**

Deep tillage for restoration of woodland areas (typically aspen) when habitat assessment indicates degraded Habitat for Fish or Wildlife. Typical scenario is two passes with a deep chisel plow with operator plus additional project manager, common hand tools and equipment; installation is greater than a quarter mile off of a drivable road; and terrain is moderate to difficult grade. Thinning undesirable species and/or pruning (if necessary) will be done under facilitating practices. Facilitating practices may include but not limited to: 314, 660, 666, 384.

**Before Situation:**

A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a need for woody vegetation management to meet Inadequate Habitat for Fish or Wildlife planning criteria. Aspen stands are not properly regenerating and are being invaded and degraded by undesirable vegetation.

**After Situation:**

Deep chisel plowing through existing stand severs the lateral roots and stimulates new growth. Regeneration improves plant and animal habitat and reduces invasive and undesirable species.

**Feature Measure:** Acres of treated area

**Scenario Unit::** Acre

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $921.22

**Scenario Cost/Unit:** $230.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 8 | $34.32 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 8 | $130.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #3 - Mowing, Simple

**Scenario Description:**

This scenario address inadequate habitat for fish and wildlife where setting back succession by mowing incoming woody species will improve habitat for the target species. Mowing can be used to increase structural diversity by creating areas of shorter vegetation preferred by some species or certain life stages of species. Mowing upland habitats which are of low intensity and low complexity, when habitat assessment indicates degraded Habitat for Fish or Wildlife. Typical "Simple/Easy" scenario is general labor with minimal supervision or skilled labor without supervision; common hand tools and equipment; installation is within a quarter mile of a drivable road; and terrain is gentle to moderate. Complexity is defined by the combination of skill level, equipment needed and ease of accessibility for creating and installing these structures. This practice may be installed alone or in combination with facilitating practices. Where the management of woody plants is require to create or maintain early successional habitat conservation practice 314 brush management or 666 forest stand improvement should be used. Where chemical control of weeds, including invasive, is required to reduce competition for the desired plant community conservation practice 315 herbaceous weed control should be used. Where the seedbank is inadequate for natural regeneration and seeding is required use conservation practice 550 range seeding or 327 Conservation Cover. Where the need is to create early successional habitat within or at the edge of woodland or forest use conservation practice 666 forest stand improvement to remove trees.

**Before Situation:**

A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a need for vegetation management with low complexity to bring Inadequate Habitat for Fish or Wildlife up to planning criteria. Wetland habitat limiting factors include quality, quantity and continuity of forage, cover, shelter, space and water availability. The project location is within a quarter mile of a drivable road and terrain is gentle to moderate. The site is static or trending to later successional plant community. The disturbance regime to maintain an earlier successional plant community is lacking. Pastures are often monotypic, lacking in diversity. Competition for sunlight from dense grass stands prevents seedling establishment. Stands are often dense and inhibit the movements of young wildlife such as game bird chicks. Area lacks diversity in the height of vegetation.

**After Situation:**

Early successional habitat maintained. Mowing improves plant and animal habitat and reduces invasive and undesirable species. The practice is installed using general labor with minimal supervision or skilled labor without supervision with use of common hand tools and small equipment; Mowing has provided more sun light for forb establishment. The heterogeneity of the habitat structure has been increased.

**Feature Measure:** Acres of treated area

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $405.45

**Scenario Cost/Unit:** $40.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2 | $101.92 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 2 | $54.24 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #4 - Mowing, Difficult

**Scenario Description:**

Mowing upland habitats which are of high intensity and high complexity, when habitat assessment indicates degraded Habitat for Fish or Wildlife. Complexity is defined by the combination of skill level, equipment needed and ease of accessibility for creating and installing these structures. Typical "difficult" scenario is equipment with operator plus additional general labor, common hand tools and equipment; installation is greater than a quarter mile of a drivable road; and terrain is moderate to difficult grade. This practice may be installed alone or in combination with facilitating practices. Facilitating practices may include but not limited to: 382, 391, 647, 660 and 666.

**Before Situation:**

A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a need for vegetation management with high complexity to bring Inadequate Habitat for Fish or Wildlife up to planning criteria. Wetland habitat limiting factors include quality, quantity and continuity of forage, cover, shelter, space and water availability. The project location is within a quarter mile of a drivable road and terrain is gentle to moderate.

**After Situation:**

Mowing improves plant and animal habitat and reduces invasive and undesirable species. The practice is installed using general labor with minimal supervision or skilled labor without supervision with use of common hand tools and small equipment;

**Feature Measure:** Acres of treated area

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $830.42

**Scenario Cost/Unit:** $83.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 4.25 | $216.58 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4.25 | $115.26 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #5 - Mowing, Multiple Treatments

**Scenario Description:**

This scenario is used to improve the quality and/or quantity of forage for at-risk wildlife populations in existing mixed herbaceous stands composed of grasses and forbs. Management actions are selected based on inventory-identified limiting factors on existing forage areas. Typically, forage quality is limited due to low density of forbs within an existing herbaceous stand. Repeat biomass removal or mowing prior to existing grasses reaching flowering and/or to removed decadent plant material s needed to prevent grass competition with forbs to ensure adequate sunlight and nutrients for desired forbs within the stand. Enhancement of forage quality will provide a short term improvement in wildlife forage availability, with support practices supplying long term permanent native forage sources. For sites managed with both mechanical harvest and with livestock grazing, a grazing management plan will be applied to ensure forage availability during the season of critical use by at-risk wildlife. Payment will be made following the last biomass harvest of the season. The primary resource concern addressed is Inadequate Habitat - habitat degradation. Typical support practices include 327 Conservation Cover, 315 Herbaceous Weed Control, 314 Brush Management, 528 Prescribed Grazing, 612 Tree/Shrub Establishment, 391 Riparian Forest Buffer & 657 Wetland Restoration.

**Before Situation:**

Forage quantity and quality for at-risk wildlife populations has been reduced due to reduction in management leading to overgrown, rank vegetation that is not a highly desired food source for species such as the Endangered Columbian white-tailed deer or Roosevelt elk population in the Olympic Peninsula region.

**After Situation:**

Management actions improve forage productivity and quality in areas critical for continued survival of at-risk wildlife on a short term basis, while separate support practices will restore native habitat needed for long term recovery of natural forage sources on or near the project area. Density of desirable forb species has increased in the stand which provides increased food resources for at-risk ungulates and other wildlife populations.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,392.03

**Scenario Cost/Unit:** $139.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 8.25 | $420.42 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8.25 | $223.74 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #6 - Disking, Simple

**Scenario Description:**

This scenario is used to improve the quality and/or quantity of forage for at-risk wildlife populations in existing mixed herbaceous stands composed of grasses and forbs. Management actions are selected based on inventory-identified limiting factors on existing forage areas. Typically, forage quality is limited due to low density of forbs within an existing herbaceous stand. Repeat biomass removal or mowing prior to existing grasses reaching flowering and/or to removed decadent plant material s needed to prevent grass competition with forbs to ensure adequate sunlight and nutrients for desired forbs within the stand. Enhancement of forage quality will provide a short term improvement in wildlife forage availability, with support practices supplying long term permanent native forage sources. For sites managed with both mechanical harvest and with livestock grazing, a grazing management plan will be applied to ensure forage availability during the season of critical use by at-risk wildlife. Payment will be made following the last biomass harvest of the season. The primary resource concern addressed is Inadequate Habitat - habitat degradation. Typical support practices include 327 Conservation Cover, 315 Herbaceous Weed Control, 314 Brush Management, 528 Prescribed Grazing, 612 Tree/Shrub Establishment, 391 Riparian Forest Buffer & 657 Wetland Restoration.

**Before Situation:**

The site is static or trending to higher successional plant species. The disturbance regime to maintain a lower successional stage is lacking. Pastures are often monotypic, lacking in diversity. Bare ground for seedling establishment is absent. Stands are often dense and inhibit the movements of younger wildlife species such as game bird chicks. A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a need for vegetation management with low complexity to bring Inadequate Habitat for Fish or Wildlife up to planning criteria. Habitat limiting factors include quality, quantity and continuity of forage, cover, shelter, space and water availability. The project location is within a quarter mile of a drivable road and terrain is gentle to moderate.

**After Situation:**

The application of this scenario improves wildlife habitat for species requiring early successional plant communities by reducing competition and creating bare ground for the establishment of early successional plants. Additionally, brood rearing habitat is improved both by the resultant food resources and the increased openness of the plant community that allows chicks to negotiate the terrain and exploit those food resources.

**Feature Measure:** Acres of treated area

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $468.09

**Scenario Cost/Unit:** $46.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 20 | $218.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #7 - Disking, Difficult

**Scenario Description:**

This practice addresses inadequate wildlife habitat for species requiring early successional habitat. This scenario provides early successional habitat by setting back succession and manipulating species composition by disking vegetation and creating bare ground. Disking upland habitats which are of low intensity and low complexity, when habitat assessment indicates degraded Habitat for Fish or Wildlife. Complexity is defined by the combination of skill level, equipment needed and ease of accessibility for creating and installing these structures. Typical "Difficult" scenario is where terrain is rough, and/or material is heavy biomass requiring multiple passes. This practice may be installed alone or in combination with facilitating practices. Where the management of woody plants is require to create or maintain early successional habitat conservation practice 314 brush management or 666 forest stand improvement should be used. Where chemical control of weeds, including invasive, is required to reduce competition for the desired plant community conservation practice 315 herbaceous weed control should be used. Where the seedbank is inadequate for natural regeneration and seeding is required, use conservation practice 550 range seeding or 327 Conservation Cover. Where the need is to create early successional habitat within or at the edge of woodland or forest use conservation practice 666 forest stand improvement to remove trees.

**Before Situation:**

The site is static or trending to higher successional plant species. The disturbance regime to maintain a lower successional stage is lacking. Pastures are often monotypic, lacking in diversity. Bare ground for seedling establishment is absent. Stands are often dense and inhibit the movements of younger wildlife species such as game bird chicks. A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a need for vegetation management with low complexity to bring Inadequate Habitat for Fish or Wildlife up to planning criteria. Habitat limiting factors include quality, quantity and continuity of forage, cover, shelter, space and water availability. The project location is within a quarter mile of a drivable road and terrain is gentle to moderate.

**After Situation:**

The application of this scenario improves wildlife habitat for species requiring early successional plant communities by reducing competition and creating bare ground for the establishment of early successional plants. Additionally, brood rearing habitat is improved both by the resultant food resources and the increased openness of the plant community that allows chicks to negotiate the terrain and exploit those food resources.

**Feature Measure:** Acres of treated area

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,387.32

**Scenario Cost/Unit:** $138.73

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 10 | $109.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 20 | $326.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #8 - Wildlife Forage Management

**Scenario Description:**

This scenario is used to improve the quality and/or quantity of forage for at-risk wildlife populations on pastureland or hayland. Management actions are selected based on inventory-identified limiting factors on existing forage areas. Typically, soil nutrients limit herbaceous forage quality. A soil test should be taken to identify limiting nutrients. In high precipitation areas, amendments such as lime are typically needed. Enhancement of forage quality will provide a short term improvement in wildlife forage availability, with support practices supplying long term permanent native forage sources. For sites with livestock grazing, a grazing management plan will be applied to ensure forage availability during the season of critical use by at-risk wildlife. The primary resource concern addressed is Inadequate Habitat - habitat degradation. Typical support practices include 327 Conservation Cover, 315 Herbaceous Weed Control, 314 Brush Management, 528 Prescribed Grazing, 612 Tree/Shrub Establishment, 391 Riparian Forest Buffer & 657 Wetland Restoration.

**Before Situation:**

Forage quantity and quality for at-risk wildlife populations has been reduced due to reduction in management leading to overgrown, rank vegetation that is not a highly desired food source for species such as the Endangered Columbian white-tailed deer or Roosevelt elk population in the Olympic Peninsula region. Typical soil tests show the need for application of one or more soil amendments such as Nitrogen (N) at 60 lb/ac, Phosphorus (P2O5) 30 lb/ac, Sulfur (S) 30 lb/ac, Potassium (K2O) 60/lb, or lime (CaCO) at 2-4 tons/ac. Prior to application of soil amendments, mowing is needed to remove decadent plant material to ensure even distribution of the nutrients.

**After Situation:**

Management actions improve forage productivity and quality in areas critical for continued survival of at-risk wildlife. Soil amendments have been applied to provided improvement to existing forage on a short term basis, while separate support practices will restore native habitat needed for long term recovery of natural forage sources near the project area.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,509.87

**Scenario Cost/Unit:** $250.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 8.25 | $420.42 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 20 | $130.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8.25 | $223.74 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4.5 | $212.63 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 900 | $405.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 900 | $360.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 1 | $10.21 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 3 | $747.87 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #1 - Nesting Box, Small

**Scenario Description:**

A structure is provided to support the nesting and rearing of smaller targeted species, such as bees and birds, and is directly mounted to a tree, building or other structure. These structures are designed to meet targeted species biology and life history needs.

**Before Situation:**

These structures are targeted for areas that lack sufficient overall habitat conditions to support viable populations of targeted species. Increased predation of target and non-targeted species may or may not be a problem. A suitable location to mount the box is available.

**After Situation:**

The installation of nesting and rearing boxes support the life-cycle needs of targeted species, such as birds, bats and pollinators. Because of suitable location and conditions the nesting box can be directly mounted such as on a tree or building, thereby eliminating the need for mounting poles and predator guards. Species such as cavity dwelling birds and pollinators use this approach, but this treatment is not limited to those species. These structures/features enhance habitat, cover, and improve species survivability.

**Feature Measure:** Number

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $59.74

**Scenario Cost/Unit:** $59.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1 | $28.40 |
| **Materials** | | | | | | |
| Habitat Box, Bird | 251 | Bluebird nesting box to increase nesting success. Each is 1-1/2" x 6" x 12-1/2" w/ 1-1/2" diameter opening. Includes materials and shipping. | Each | $31.34 | 1 | $31.34 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #2 - Nesting Box, Small, with wood pole

**Scenario Description:**

Constructing a nest box and mounting on a wooden pole. A structure is provided to support the nesting and rearing of targeted species, such as pollinators and birds. Trees, buildings or other structures are not available. These structures are designed to meet targeted species biology and life history needs. Addresses Resource Concern: Inadequate Cover/Shelter.

**Before Situation:**

These structures are targeted for areas that lack sufficient overall habitat conditions to support viable populations of targeted species. Increased predation of target and non-targeted species may or may not be a problem.

**After Situation:**

The installation nesting and rearing boxes support the life-cycle needs of targeted species, such as blue birds and waterfowl. Location and conditions suggest that predator guards are not needed. These structures/features enhance habitat, cover, and improve species survivability.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $106.76

**Scenario Cost/Unit:** $106.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formless, non reinforced | 36 | Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $138.47 | 0.1 | $13.85 |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 0.5 | $3.59 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1.5 | $42.60 |
| **Materials** | | | | | | |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.38 | 1 | $15.38 |
| Habitat Box, Bird | 251 | Bluebird nesting box to increase nesting success. Each is 1-1/2" x 6" x 12-1/2" w/ 1-1/2" diameter opening. Includes materials and shipping. | Each | $31.34 | 1 | $31.34 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #3 - Nesting Box, Large

**Scenario Description:**

A structure is provided to support the nesting and rearing of larger targeted species such as waterfowl, bats and barn owls, and is directly mounted to a tree, building or other structure. These structures are designed to meet targeted species biology and life history needs. Addresses Resource Concern: Inadequate Cover/Shelter.

**Before Situation:**

These structures are targeted for areas that lack sufficient overall habitat conditions to support viable populations of targeted species. Increased predation of target and non-targeted species may or may not be a problem. A suitable location to mount the box is available.

**After Situation:**

The installation of nesting and rearing boxes support the life-cycle needs of targeted species, such as birds, bats and pollinators. Because of suitable location and conditions the nesting box can be directly mounted such as on a tree or building, thereby eliminating the need for mounting poles and predator guards. Species such as cavity dwelling birds and pollinators use this approach, but this treatment is not limited to those species. These structures/features enhance habitat, cover, and improve species survivability.

**Feature Measure:** Number

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $101.95

**Scenario Cost/Unit:** $101.95

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1 | $28.40 |
| **Materials** | | | | | | |
| Habitat Box, waterfowl | 1449 | Wood Duck Box, typically 24" x 11" x 12" with 4" wide oval entrance, single. Includes material and shipping only. | Each | $73.55 | 1 | $73.55 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #4 - Nesting Box, Large, with steel pole

**Scenario Description:**

Constructing a nest box on a steel pole with a predator guard where needed. A structure is provided to support the nesting and rearing of larger targeted species such as waterfowl, bats and barn owls. These structures are designed to meet targeted species biology and life history needs. Addresses Resource Concern: Inadequate Cover/Shelter.

**Before Situation:**

These structures are targeted for areas that lack sufficient overall habitat conditions to support viable populations of targeted species. Increased predation of target and non-targeted species may also be a problem.

**After Situation:**

The installation of pole mounted nesting and rearing boxes support the life-cycle needs of targeted species, such as bats and waterfowl. Predator guards provide needed protection of target species during nesting and rearing. These structures/features enhance habitat, cover, and reduce predation.

**Feature Measure:** Number

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $252.78

**Scenario Cost/Unit:** $252.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formless, non reinforced | 36 | Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $138.47 | 0.1 | $13.85 |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 0.5 | $3.59 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1.5 | $42.60 |
| **Materials** | | | | | | |
| Pipe, steel, galvanized, threaded, 1¼ ", schedule 40 | 256 | Spec. A-53, includes coupling and clevis hanger assembly sized for covering, 10' OC | Foot | $7.92 | 10 | $79.20 |
| Habitat Box, waterfowl | 1449 | Wood Duck Box, typically 24" x 11" x 12" with 4" wide oval entrance, single. Includes material and shipping only. | Each | $73.55 | 1 | $73.55 |
| Predator Guard | 1461 | Predator guards (i.e. stove pipes, cone, hole guard, etc.) for habitat boxes. Materials only. Includes material and shipping only. | Each | $39.99 | 1 | $39.99 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #5 - Raptor Perch Pole

**Scenario Description:**

A structure is provided to improve wildlife habitat by providing a raptor perch. These structures are designed to meet targeted species biology and life history needs. Poles are typically 12 to 15 feet above the ground surface, and buried 3 ft or more. Resource Concern: Inadequate Space, Habitat Fragmentations

**Before Situation:**

These structures are targeted for areas that lack sufficient overall habitat conditions to support viable populations of targeted species. Insufficient perch locations are available.

**After Situation:**

The installation of a raptor perch pole enhances the overall habitat needs of targeted species. These structures/features enhance habitat and improve species survivability.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $551.47

**Scenario Cost/Unit:** $551.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formless, non reinforced | 36 | Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $138.47 | 0.1 | $13.85 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1 | $28.40 |
| **Materials** | | | | | | |
| Pipe, steel, galvanized, threaded, 2", schedule 40 | 257 | Spec. A-53, includes coupling and clevis hanger assembly sized for covering, 10' OC | Foot | $28.29 | 18 | $509.22 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #6 - Burrowing Owl Burrow (set of 2)

**Scenario Description:**

A structure is provided to improve wildlife habitat by providing 2 burrowing owl burrows. These structures are designed to meet targeted species biology and life history needs. Two nesting locations are provided per site. Each nesting site has two points of access. The two nest locations may also be connected. Resource Concerns: Inadequate Cover/Shelter, Threatened and Endangered Fish and Wildlife Species: Species of Concern.

**Before Situation:**

These structures are targeted for areas that lack sufficient overall habitat conditions to support viable populations of targeted species. Insufficient natural burrow locations are available.

**After Situation:**

The installation of a burrowing owl burrow enhances the overall habitat needs of targeted species. These structures/features enhance habitat and improve species survivability.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $407.46

**Scenario Cost/Unit:** $407.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 2 | $110.06 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 2 | $54.24 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SCH 40 | 980 | Materials: - 6" - PVC - SCH 40 - ASTM D1785 | Foot | $6.33 | 24 | $151.92 |
| Pipe, HDPE, 4", PCPT, Single Wall | 1270 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only. | Foot | $0.48 | 60 | $28.80 |
| Bucket, 5 gal | 1758 | 5 gallon plastic bucket. Materials only. | Each | $2.82 | 2 | $5.64 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #7 - Brush and Rock Piles

**Scenario Description:**

A brush pile or rock pile provides improved wildlife habitat by providing resting and escape cover. These structures are located and constructed to meet targeted species biology and life history needs. While size varies, brush piles are typically 10 ft in diameter and 6 ft high at the center. Multiples brush piles are better than one larger pile, and two to four piles per acre of area adjacent to woodlands is desirable. Piles are typically 200 to 300 ft apart. Stumps, logs, rocks and pipes are typically placed at the bottom with limbs and leaves placed on top, thereby allowing easy access to the bottom of the pile. These piles can provide nesting habitat, resting areas, concealment, and protection from some predators for birds, rabbits, and other small mammals. Rock piles provide shelter and basking areas for amphibians and reptiles such as frogs, lizards, salamanders and snakes. Large rocks are typically placed at the bottom. Often depressions are dug in the ground surface and covered with flat rocks to create temporary pools for breeding frogs and salamanders. Rocks absorb heat in the day and radiate heat at night. Materials for brush and rock piles are collected locally.

**Before Situation:**

These structures are targeted for areas that lack sufficient overall habitat conditions to support viable populations of targeted species. Insufficient ground cover is available for resting, basking, and escape cover. Existing brushy cover is lacking or not well distributed.

**After Situation:**

The installation of a brush piles and rock piles enhances the overall habitat needs of numerous terrestrial species. These structures/features enhance habitat and improve species survivability. By providing resting, basking, and escape cover, larger open spaces are more effectively used by ground nesting birds, amphibians, reptiles, and small mammals. Increased cover reduces predation.

**Feature Measure:** Number of Piles

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $300.96

**Scenario Cost/Unit:** $300.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 2 | $87.56 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 4 | $17.16 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 5 | $142.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 2 | $54.24 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #8 - Escape Ramp

**Scenario Description:**

Retrofit an existing watering trough/tank with an appropriately designed and installed wildlife escape ramp to reduce wildlife mortality and improve wildlife habitat. Typical ramps are built according to 614 practice standard and guidance in "Water for Wildlife" publication: http://www.batcon.org/pdfs/water/bciwaterforwildlife.pdf

**Before Situation:**

These structures are targeted for containers (tank, trough, or other watertight container) or small basins provisioning livestock water that currently restrict birds, small mammals, amphibians and other wildlife species from the ability to escape these confined structures once entered.

**After Situation:**

Watering facilities and basins equipped with escape ramps facilitate movement of the trapped wildlife species across these ramps and safely exist from the watering facility or basin. These structures are constructed along side of the watering facility extending from the to the bottom of the container to the top inside edge. Appropriate placement at an angle and flush to the container wall enhances the successful use of escaping animal.

**Feature Measure:** Each Ramp

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $53.56

**Scenario Cost/Unit:** $53.56

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1 | $28.40 |
| **Materials** | | | | | | |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $25.16 | 1 | $25.16 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #9 - Fence Markers, Vinyl Undersill

**Scenario Description:**

Existing fences are retrofitted with vinyl markers that increase wire visibility and reduce mortality due to collision for wildlife species of concern like sage-grouse. Markers are installed approximately every 3 feet along top wire. Scenario is typically implemented along fences in potential high risk areas (red areas in SGI Fence Collision Risk Model) or where a known problem exists.

**Before Situation:**

Wire fences located in high risk areas of sage-grouse breeding or winter concentration grounds pose a collision threat to sage-grouse. Collisions contribute to mortality for a declining species.

**After Situation:**

Fences pose little-to-no risk for sage-grouse. This infrastructure threat is considered ameliorated. [This wholly beneficial practice can minimize risk of wildlife injury or death associated with fences, according to USFWS SGI Conference Report.]

**Feature Measure:** feet of fence marked

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,320.0

**Scenario Total Cost:** $248.96

**Scenario Cost/Unit:** $0.19

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 1 | $27.76 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 5 | $142.00 |
| **Materials** | | | | | | |
| Vinyl Undersill Strips | 241 | Marking material using the "undersill" strips of vinyl siding. Priced per foot of fence per each wire. Materials only. | Foot | $0.06 | 1320 | $79.20 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #11 - Snag Creation

**Scenario Description:**

Create snags from existing live trees to provide nesting, foraging, perching, thermal cover, and display habitat for target species such as cavity nesting birds (woodpeckers, songbirds, wood duck, etc.), small mammals (shrew, chipmunk, flying squirrel, bats, etc.), amphibians and reptiles and bumble bees. Trees must be at least 12” DBH. Resulting snag will be a minimum of 25’ tall. Snag creation methods may include girdling, chemical injection, or high topping.

**Before Situation:**

These structures are targeted for areas that lack sufficient snag habitat conditions to support viable populations of targeted species. Insufficient cavity nests, foraging, and perching habitat exists on the planning unit. Existing snag habitat is lacking or not well distributed.

**After Situation:**

Snag creation enhances the overall habitat condition for numerous terrestrial species. These structures/features enhance habitat and improve species survivability. By providing cavity nesting sites, invertebrate foraging area, perching/hunting opportunities, and thermal cover/escape cover, larger open spaces are more effectively used by cavity nesting birds and pollinators, amphibians, reptiles, and small mammals. Increased cover reduces predation.

**Feature Measure:** Number of snags

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $30.55

**Scenario Cost/Unit:** $30.55

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 0.5 | $2.15 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1 | $28.40 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #12 - Downed Large Wood-Upland

**Scenario Description:**

Large log is placed on the upland or riparian forest floor to provide cover, denning, thermal regulation, and/or forage sites for wildlife species such as small mammals, amphibians, and game birds. Large wood is defined as a minimum log diameter of 12" and 20 ft long length. Forest terrain is moderate with existing forest road infrastructure. Log sections are cut on site or hauled. Installation of downed logs deemed necessary following a Wildlife Habitat Evaluation score below planning criteria level. Primary Resource concern is Inadequate Habitat for Fish or Wildlife-habitat degradation. This practice may be installed alone or in combination with facilitating practices. Facilitating practices may include but not limited to: 382, 391,612, 660 and 666.

**Before Situation:**

A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a need for increased structural complexity in the forest understory to bring one or more habitat limiting factors under Inadequate Habitat for Fish or Wildlife, up to planning criteria. Upland habitat limiting factors include quality, quantity and continuity of forage, cover, shelter, space and water availability. The structures can be installed within a quarter mile of a drivable road and terrain is gentle to moderate.

**After Situation:**

Installation of downed large wood brings the identified deficient habitat limiting factors up to planning criteria. The practice is installed using general labor with minimal supervision or skilled labor without supervision with use of common hand tools and small equipment;

**Feature Measure:** Number of stems large wood

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $380.54

**Scenario Cost/Unit:** $380.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 1.5 | $65.67 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1.5 | $42.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 1.5 | $40.68 |
| **Materials** | | | | | | |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 1 | $231.59 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #13 - Wetland Basking Structure

**Scenario Description:**

Constructing, installing, maintaining, and monitoring basking structures to provide basking/loafing cover. It is applied in wetlands and ponds where a habitat evaluation has revealed that basking/loafing cover is a limiting factor for turtles, amphibians, or other wetland wildlife and where natural recovery of that habitat element is either unlikely or will take many years. Basking structures usually consist of a large dead tree, preferable conifer were appropriate, placed in a wetland/pond in direct sunlight. An ideal basking log will have equal surface area exposed to the sun and submerged under water as a place for turtles and amphibians to hide if startled. Structures are anchored to reduce movement.

**Before Situation:**

Existing habitat in wetlands and ponds possess inadequate basking/loafing cover for turtles, amphibians, or other wetland wildlife. Natural recovery of that habitat element is either unlikely or will take many years.

**After Situation:**

Basking Structure is installed by placing a large log a minimum of 12" diameter into a wetland or pond in an open canopy area. The bottom half of the log is submerged and the top half is in direct sunlight. enough structures are installed so that basking habitat has been increased and/or restored to the area.

**Feature Measure:** each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,463.13

**Scenario Cost/Unit:** $1,463.13

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 2 | $113.28 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 2 | $54.24 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $68.83 | 2 | $137.66 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 5 | $1,157.95 |

**Practice:** 650 - Windbreak/Shelterbelt Renovation

**Scenario** #2 - Thinning

**Scenario Description:**

Windbreak is thinned by hand w/chainsaw and cut stumps have herbicide applied to prevent undesirable sprouting. Slash is treated using Woody Residue Treatment (384) when needed. Resource concern is degraded plant condition- undesirable plant productivity and health.

**Before Situation:**

Windbreak functionality has decreased. Windbreak tree and/or shrub species are overly dense and do not provide the desired wind protection.

**After Situation:**

Integrity of windbreak restored, function and health improved.

**Feature Measure:** Length of Renovation

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $905.56

**Scenario Cost/Unit:** $1.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 10 | $42.90 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 2 | $127.42 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |
| **Materials** | | | | | | |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $44.20 | 0.5 | $22.10 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |

**Practice:** 650 - Windbreak/Shelterbelt Renovation

**Scenario** #3 - Pruning

**Scenario Description:**

Windbreak is pruned by hand (hand tools + chainsaw) to improve shape and form of trees and/or shrubs so that the overall effectiveness of the windbreak will improve. Slash is treated using associated practice 384-Woody Residue Treatment to prevent potential insect, disease, fire and operability problems.

**Before Situation:**

The windbreak tree and or shrub species have become to 'leggy' (grown to tall) or are growing beyond the bounds of the designated windbreak area. Overall density of windbreak is lower than desired optimum. Resource concern is Degrade plant condition- undesirable plant productivity and health; Livestock Production-Inadequate livestock shelter.

**After Situation:**

Integrity of windbreak restored; impacts of wind reduced. 500 feet of windbreaks or shelterbelts

**Feature Measure:** Length of Renovation

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $759.94

**Scenario Cost/Unit:** $1.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 8 | $34.32 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 3 | $64.17 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 2 | $10.14 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 11 | $312.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** 650 - Windbreak/Shelterbelt Renovation

**Scenario** #4 - Removal, Chain Saw, Replanting

**Scenario Description:**

Windbreak renovation requires the removal of degraded or inappropriate trees or shrubs within a windbreak; typically using a chain saw and/or other hand tools followed by replanting. This may include removal of entire rows, including stumps or roots, or selected trees/shrubs in order to prepare for the necessary planting of a replacement row within the windbreak, improve the health of the remaining rows, and/or allow for supplemental planting to expand the windbreak. Scenario includes supplemental planting to fill in gaps as needed. For treatment of slash, use associated Practice 384-Woody Residue Treatment when needed. Resource concerns: Degraded plant condition-undesirable plant productivity and health; Livestock Production-Inadequate livestock shelter, Soil erosion-wind.

**Before Situation:**

Plant (trees and/or shrubs) health has degraded decreasing the effectiveness of the original windbreak design. Plants lack leaf cover, have dead branches, gaps of no live green material and some are completely dead. Wind now moves freely thru areas that lack any leaves.

**After Situation:**

Integrity and function of windbreak restored. 500 feet of windbreak/shelterbelt renovated. Trees/Shrubs have been planted to supplement the areas cleared.

**Feature Measure:** Length of Renovation

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $1,288.16

**Scenario Cost/Unit:** $2.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 6 | $25.74 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 3 | $64.17 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 2 | $10.14 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 13 | $369.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 25 | $41.75 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 25 | $20.75 |
| Tree, conifer, seedling, containerized, 15 cu. in. | 1520 | Containerized conifer stock, 15 cubic inches (e.g. 2.0" x 6"). Includes materials and shipping only. | Each | $0.58 | 25 | $14.50 |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.50 | 25 | $112.50 |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.37 | 25 | $109.25 |
| Tree shelter, solid tube type, 3-1/4" x 24" | 1559 | 3-1/4" x 24" tree tube for protection from animal damage. Materials only. | Each | $1.45 | 125 | $181.25 |

**Practice:** 650 - Windbreak/Shelterbelt Renovation

**Scenario** #5 - Removal, <8 inches DBH with Skidsteer, Replanting

**Scenario Description:**

Renovate a windbreak or shelterbelt using heavy equipment to remove selected trees with average DBH < 8 Inches and replant with appropriate trees/shrubs to fill in gaps. Typically trees and shrubs are cleared by a Skidsteer using a tree sheer or saw. All slash material from cutting and pruning treated is either scattered and crushed, piled and crushed, chipped or removed from the treatment area. Use associated Practice: 384-Woody Residue Treatment where needed. Resource concerns include: Degraded plant condition-undesirable plant productivity and health; Livestock Production-Inadequate livestock shelter, Soil erosion-wind.

**Before Situation:**

Plant (trees and/or shrubs) health has degraded decreasing the effectiveness of the original windbreak design. Plants lack leaf cover, have dead branches, gaps of no live green material and some are completely dead. Wind now moves freely thru areas that lack any leaves.

**After Situation:**

Integrity and function of windbreak restored. Typical length - 500'. Trees/Shrubs have been planted to supplement the areas cleared.

**Feature Measure:** Length of Renovation

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $1,912.01

**Scenario Cost/Unit:** $3.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 6 | $262.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 5 | $142.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 7 | $189.84 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 25 | $41.75 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 25 | $20.75 |
| Tree, conifer, seedling, containerized, 15 cu. in. | 1520 | Containerized conifer stock, 15 cubic inches (e.g. 2.0" x 6"). Includes materials and shipping only. | Each | $0.58 | 25 | $14.50 |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.50 | 25 | $112.50 |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.37 | 25 | $109.25 |
| Tree shelter, solid tube type, 3-1/4" x 24" | 1559 | 3-1/4" x 24" tree tube for protection from animal damage. Materials only. | Each | $1.45 | 125 | $181.25 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 650 - Windbreak/Shelterbelt Renovation

**Scenario** #6 - Removal, > 8 inches DBH with Dozer, Replanting

**Scenario Description:**

Windbreak renovation requires the removal of degraded or inappropriate trees with an average DBH >8" within a windbreak and replant with appropriate trees/shrubs to fill in gaps. Typically a dozer is used to remove either entire rows, including stumps or roots, or selected trees/shrubs within the windbreak. Use associated Practice: 384-Woody Residue Treatment where needed. Resource concerns include Degraded plant condition- undesirable plant productivity and health; Livestock Production-Inadequate livestock shelter, Soil erosion-wind.

**Before Situation:**

Plant (trees and/or shrubs) health has degraded decreasing the effectiveness of the original windbreak design. Plants lack leaf cover, have dead branches, gaps of no live green material and some are completely dead. Wind now moves freely thru areas that lack any leaves.

**After Situation:**

Integrity and function of windbreak restored. Wind impacts are reduced by renovating 500 foot windbreaks or shelterbelts using heavy equipment to remove selected trees with average DBH > 8 inches. Typically trees and shrubs are cleared by dozer (D-6 or equivalent) using a brush rake or blade. All slash material from cutting and pruning is either scattered and crushed, piled and crushed, chipped or removed from the treatment area. Trees/Shrubs have been planted to supplement the areas cleared.

**Feature Measure:** Length of Renovation

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $2,448.49

**Scenario Cost/Unit:** $4.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 6 | $730.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 5 | $142.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 7 | $281.12 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 25 | $41.75 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 25 | $20.75 |
| Tree, conifer, seedling, containerized, 15 cu. in. | 1520 | Containerized conifer stock, 15 cubic inches (e.g. 2.0" x 6"). Includes materials and shipping only. | Each | $0.58 | 25 | $14.50 |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.50 | 25 | $112.50 |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.37 | 25 | $109.25 |
| Tree shelter, solid tube type, 3-1/4" x 24" | 1559 | 3-1/4" x 24" tree tube for protection from animal damage. Materials only. | Each | $1.45 | 125 | $181.25 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 650 - Windbreak/Shelterbelt Renovation

**Scenario** #7 - Supplemental Planting, Container

**Scenario Description:**

Parts of the windbreak being renovated have died. Supplemental plantings of containerized trees/shrubs will improve the effectiveness and longevity of the windbreak without the need for removal of degraded trees. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition -Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter.

**Before Situation:**

Dead trees/shrubs are inhibiting windbreak effectiveness or windbreak allows too much air passage to serve intended purpose.

**After Situation:**

The integrity and function of the windbreak is restored. A one (1.0) acre windbreak/shelterbelt is expanded through the planting of containerized tree and shrub seedlings at a average spacing of 8' (shrubs 4'-6', deciduous/conifer trees 8'-12') within row and 15'-20' between rows. Planting is achieved through hand planting.

**Feature Measure:** Area of Renovation

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,595.47

**Scenario Cost/Unit:** $1,595.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 3 | $64.17 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 9 | $111.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 11 | $312.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 100 | $56.00 |
| Tree, conifer, seedling, containerized, 10 cu. in. | 1519 | Containerized conifer stock, 10 cubic inches (approx 6" plug), 1.7" x 6"). Includes materials and shipping only. | Each | $0.83 | 150 | $124.50 |
| Tree, hardwood, seedling or transplant, potted, 1 qt. | 1529 | Potted hardwood tree, 1 quart. Includes materials and shipping only. | Each | $2.44 | 25 | $61.00 |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.50 | 25 | $112.50 |
| Tree, conifer, seedling or transplant, potted, 1 qt. | 1534 | Potted conifer tree, 1 quart. Includes materials and shipping only. | Each | $2.42 | 25 | $60.50 |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.37 | 25 | $109.25 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.53 | 350 | $185.50 |
| Cable ties, plastic | 1575 | Plastic cable ties (typ. 8-12") to assist in securing items. Materials only. | Each | $0.05 | 350 | $17.50 |
| Stake, bamboo, 3/8" x 36" | 1584 | 3/8" x 36" bamboo stakes to anchor items in place. Inlcudes materials and shipping only. | Each | $0.12 | 350 | $42.00 |

**Practice:** 650 - Windbreak/Shelterbelt Renovation

**Scenario** #8 - Supplemental Planting, Bare Root

**Scenario Description:**

Parts of the windbreak being renovated have died. Supplemental plantings of bare root trees/shrubs are planted by hand to improve the effectiveness and longevity of the windbreak without the need for removal of degraded trees. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition - Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter.

**Before Situation:**

Dead trees/shrubs are inhibiting windbreak effectiveness or windbreak allows too much air passage to serve intended purpose.

**After Situation:**

The integrity and function of the windbreak is restored. A one (1.0) acre windbreak/shelterbelt is expanded through the planting of bare root tree and shrub seedlings at a average spacing of 8' (shrubs 4'-6', deciduous/conifer trees 8'-12') within row and 15'-20' between rows. Planting is achieved through hand planting.

**Feature Measure:** Area of Renovation

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $647.50

**Scenario Cost/Unit:** $647.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 6 | $74.16 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 6 | $170.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.54 | 200 | $108.00 |
| Tree, conifer, seedling, bare root, 1-1 | 1513 | Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only. | Each | $0.46 | 150 | $69.00 |

**Practice:** 650 - Windbreak/Shelterbelt Renovation

**Scenario** #9 - Coppicing

**Scenario Description:**

Coppicing of selected trees and understory vegetation in a windbreak/shelterbelt is needed to ensure that species composition and stand structure continue to serve their intended purpose. Resource concern is Degraded plant condition- undesirable plant productivity and health.

**Before Situation:**

Species composition, stocking rate, and stand structure do not serve intended purpose.

**After Situation:**

The integrity and function of the windbreak is restored. One acre of windbreak/shelterbelt renovation carried out through manipulating species composition, stand structure, and stocking by the cutting of selected trees and understory vegetation for coppicing and by removing or disposing of slash so as to not interfere with the intended purpose. This manipulation does not include pruning.

**Feature Measure:** Area of Renovation

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,266.44

**Scenario Cost/Unit:** $1,266.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 8 | $350.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 10 | $271.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 654 - Road/Trail/Landing Closure and Treatment

**Scenario** #1 - Light, Reshaping

**Scenario Description:**

Reshaping to natural conditions. This scenario includes using light equipment such as small backhoe and skidsteer for the installation of water control devices such as water bars, rolling dips, controlling access, use of woody residue and pulling drainages. This practice addresses one or more resource concerns: Excessive Sediment in surface waters, Habitat Degradation, and Concentrated Flow Erosion. Since not all segments of the road/trail system may require this level of treatment, this scenario applies only to those segments that are causing the resource concerns. For landing sites, an additional road length may be added to the quantities to include the area of landing addressed assuming a 14' width (i.e. for a landing that is 50x50 sq ft, add 178' of road length to the total quantity).

**Before Situation:**

The legacy trail/road are severely affecting wetland/riparian areas, slope stability, and water quality. The trail/roads can no longer serve its intended use and is incapable of handling needed equipment and traffic. Alternative access is possible, therefore abandonment and rehabilitation is the best way to address the resource concerns and problems that are being created.

**After Situation:**

The resource concerns are addressed by the abandonment of the road and its drainage elements, and by re-seeding to native grasses. The typical scenario includes using light equipment such as a backhoe for the installation of water control devices such as water bars, rolling dips, controlling access, use of woody residue and pulling drainages on 500 feet of road on 35% hill slopes and a moderate grade. Native vegetation is re-established by seeding. Some light hand work may be needed to clear site for the equipment.

**Feature Measure:** length

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $2,176.50

**Scenario Cost/Unit:** $4.35

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 4 | $220.12 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 4 | $175.12 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 3 | $12.87 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 1 | $12.37 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 4 | $111.04 |
| Water Bars | 1500 | Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length. | Foot | $2.94 | 85 | $249.90 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 7 | $198.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 12 | $325.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| **Materials** | | | | | | |
| One Species, Cool Season, Native Perennial Grass | 2312 | Native, cool season perennial grass. Includes material and shipping only. | Acre | $155.64 | 0.5 | $77.82 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 654 - Road/Trail/Landing Closure and Treatment

**Scenario** #2 - Heavy, <35% hillslope

**Scenario Description:**

The practice includes permanent road/trail/landing closure, treatment, or removal and hydrological reconnection of the hillslope to applicable drainage networks in areas requiring heavy equipment with hillslopes 35% or less. The treatment will prohibit future access. Tree/Shrub Site Prep and Planting is not included, however is recommended as an associated practice. When completed, there is no additional maintenance with heavy equipment needed. This practice addresses one or more resource concerns: Excessive Sediment in surface waters and Concentrated Flow Erosion. Since not all segments of the road/trail system may require this level of treatment, this scenario applies only to those segments that are causing the resource concerns. For landing sites, an additional road length may be added to the quantities to include the area of landing addressed assuming a 14' width (i.e. for a landing that is 50x50 sq ft, add 178' of road length to the total quantity).

**Before Situation:**

The legacy trail/road is severely affecting wetlands, riparian areas, slope stability, water quality and possibly T&E species. The trail/road can no longer serve its intended use and is incapable of handling needed equipment and traffic. Alternative access is possible. Therefore abandonment and site restoration are the best approaches to address the resource concerns and problems that are being created.

**After Situation:**

The resource concerns are addressed by the abandonment of the road and its drainage elements, and by re-seeding to native grasses. Road abandonment meets local and state requirements. The typical scenario includes decommissioning 500 ft of an 18-foot wide trail/road with a landing on 30% forest slopes, using heavy equipment such as a bulldozer or similar equipment (excavator or road grader with ripper) to re-shape and obliterate the road base and landings in order to re-establish native vegetation. It also includes restoring hydrology with the removal of culverts and drainage fills. Necessary erosion control measures such as water bars are installed. Some hand-work may be necessary to clear the site for the equipment. The work will be supervised by a consultant forester, land manager, or other resource professional.

**Feature Measure:** length

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $3,974.85

**Scenario Cost/Unit:** $7.95

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 6 | $389.52 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 3 | $334.98 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 3 | $131.34 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 4 | $17.16 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 1 | $12.37 |
| Water Bars | 1500 | Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length. | Foot | $2.94 | 225 | $661.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 3 | $81.36 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 13 | $522.08 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| **Materials** | | | | | | |
| One Species, Cool Season, Native Perennial Grass | 2312 | Native, cool season perennial grass. Includes material and shipping only. | Acre | $155.64 | 0.5 | $77.82 |
| **Mobilization** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |

**Practice:** 654 - Road/Trail/Landing Closure and Treatment

**Scenario** #3 - Heavy, >35% hillslope

**Scenario Description:**

The practice includes permanent road/trail/landing closure and treatment and the hydrological reconnection of the hillslope to applicable drainage networks in areas requiring heavy equipment with hillslopes > 35%. The treatment will limit future access. Tree/Shrub Site Prep and Planting is not included, however it is recommended as an associated practice. When completed, there is no additional maintenance with heavy equipment needed. This practice addresses one or more resource concerns: Excessive Sediment in surface waters and Concentrated Flow Erosion. Since not all segments of the road/trail system may require this level of treatment, this scenario applies only to those segments that are causing the resource concerns. For landing sites, an additional road length may be added to the quantities to include the area of landing addressed assuming a 14' width (i.e. for a landing that is 50x50 sq ft, add 178' of road length to the total quantity). For landing sites, an additional road length may be added to the quantities to include the area of landing addressed assuming a 14' width (i.e. for a landing that is 50x50 sq ft, add 178' of road length to the total quantity).

**Before Situation:**

The legacy trail/road is severely affecting wetlands, riparian areas, unstable slopes, water quality, and possibly T&E species. The trail/road can no longer serve its intended use and is incapable of handling needed equipment and traffic. Alternative access was possible. Therefore abandonment and site restoration are the best approaches to address the resource concerns and problems that are being created.

**After Situation:**

The resource concerns are addressed by the abandonment of the road and its drainage elements, and by re-seeding to native grasses and forbs. Road abandonment meets local and state requirements. The typical scenario includes decommissioning a 24-foot wide, earthen road with landings on forest slopes over 35%, using a bulldozer or other heavy equipment such as an excavator, dozer and/or road grader with ripper to re-shape and obliterate the road base and landings in order to re-establish native vegetation. It also includes restoring hydrology with the removal of culverts, drainage fills, as well as stabilizing cuts & fills. Necessary erosion control measures such as out sloping, rolling dips, or water bars are installed. The steep slopes make this scenario costly due to the increased time needed to apply the measures and the need for additional water control devices or cut & fill stabilization. Some hand-work may be necessary to clear the site for the equipment. The work will be supervised by a consultant forester, land manager, or other resource professional.

**Feature Measure:** length

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $6,377.23

**Scenario Cost/Unit:** $12.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 4 | $220.12 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 8 | $519.36 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 6 | $968.64 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 6 | $262.68 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 2 | $8.58 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 1 | $12.37 |
| Water Bars | 1500 | Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length. | Foot | $2.94 | 480 | $1,411.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 22 | $883.52 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| One Species, Cool Season, Native Perennial Grass | 2312 | Native, cool season perennial grass. Includes material and shipping only. | Acre | $155.64 | 0.5 | $77.82 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 654 - Road/Trail/Landing Closure and Treatment

**Scenario** #5 - Light, Vegetative

**Scenario Description:**

Minimal re-shaping to natural conditions using light equipment and the establishment of permanent vegetation. This scenario includes using smaller equipment (ag tractor/skidsteer/small dozer/backhoe) for the installation of water control devices such as water bars and rolling dips, controlling access, and pulling drainages. Use associated practice, 484-Mulching, where needed to protect the newly seeded site with straw mulch. This practice addresses one or more resource concerns: Excessive Sediment in surface waters, Wildlife Habitat Degradation, and Concentrated Flow Erosion. Since not all segments of the road/trail system may require this level of treatment, this scenario applies only to those segments that are causing the resource concerns. For landing sites, an additional road length may be added to the quantities to include the area of landing addressed assuming a 14' width (i.e. for a landing that is 50x50 sq ft, add 178' of road length to the total quantity).

**Before Situation:**

Legacy trail/road is not necessary and is affecting wetlands, riparian areas, water quality, and possibly T&E species. The trail/road can no longer serve its intended use and is incapable of handling needed equipment and traffic. Alternative access was possible; therefore abandonment and site restoration are the best approaches to address the resource concerns and problems that are being created.

**After Situation:**

The re-vegetated, eliminated road addressed the resource concern. This scenario includes using smaller equipment (ag tractor/skidsteer/small dozer/backhoe) for the installation of water control devices such as water bars and rolling dips, controlling access, and pulling drainages on 500 feet of 12' wide road on 5%-35% hill slopes and little grade. Soil amendments are applied as per the FOTG guidance.

**Feature Measure:** length of landing/trail(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $1,487.13

**Scenario Cost/Unit:** $2.97

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 1 | $43.78 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 1 | $16.30 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 1 | $6.50 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.44 | 1 | $10.44 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 1 | $12.37 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 2 | $55.52 |
| Water Bars | 1500 | Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length. | Foot | $2.94 | 100 | $294.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4 | $108.48 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.45 | 10 | $4.50 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.40 | 10 | $4.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $38.88 | 1 | $38.88 |
| One Species, Cool Season, Native Perennial Grass | 2312 | Native, cool season perennial grass. Includes material and shipping only. | Acre | $155.64 | 1 | $155.64 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 654 - Road/Trail/Landing Closure and Treatment

**Scenario** #6 - Riparian Zone, <35% hillslope

**Scenario Description:**

The practice includes permanent road/trail/landing closure, treatment, or removal in riparian areas adjacent to a watercourse where heavy equipment is required and hillslopes are 35% or less. Treatment will reconnect hydrology of the hillslope to applicable drainage networks and re-establish slopes and site to pre road conditions. Exposed soil is mulched and/or seeded (see associated practices 484-Mulching and 342-Critical Area Planting). The treatment will prohibit future access. Tree/Shrub Site Prep and Planting is not included, however is recommended as an associated practice. When completed, there is no additional maintenance with heavy equipment needed. This practice addresses one or more resource concerns: Excessive Sediment in surface waters and Concentrated Flow Erosion. Since not all segments of the road/trail system may require this level of treatment, this scenario applies only to those segments that are causing the resource concerns. For landing sites, an additional road length may be added to the quantities to include the area of landing addressed assuming a 14' width (i.e. for a landing that is 50x50 sq ft, add 178' of road length to the total quantity).

**Before Situation:**

The legacy trail/road is severely affecting wetlands, riparian areas, slope stability, water quality and possibly T&E species. The trail/road can no longer serve its intended use and is incapable of handling needed equipment and traffic. Alternative access is possible, therefore abandonment and site restoration are the best approaches to address the resource concerns and problems that are being created.

**After Situation:**

The resource concerns are addressed by the abandonment of the road and its drainage elements, and by re-seeding to native grasses. Site topography is restored to the pre-road conditions. Road abandonment meets local, state, and federal regulatory requirements. The typical scenario includes decommissioning a 500 ft of an 18-foot wide trail/road with a landing on 30% forest slopes, using heavy equipment such as a bulldozer or similar equipment (excavator or road grader with ripper) to re-shape and obliterate the road base and landings in order to re-establish pre-road slopes and native vegetation. It also includes restoring hydrology with the removal of culverts and drainage fills as well as stabilizing cuts and fills. Necessary erosion control measures such as out sloping or rolling dips are installed. Some hand-work may be necessary to clear the site for the equipment. Exposed soil surfaces near streams are mulched or covered with natural materials, such as slash or straw using associated practice 484-Mulching. The work will be supervised by a consultant forester, land manager, or other resource professional.

**Feature Measure:** length

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $5,024.91

**Scenario Cost/Unit:** $10.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 12 | $779.04 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 6 | $669.96 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 6 | $262.68 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 8 | $34.32 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 16 | $342.24 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 1 | $12.37 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 22 | $883.52 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| **Materials** | | | | | | |
| One Species, Cool Season, Native Perennial Grass | 2312 | Native, cool season perennial grass. Includes material and shipping only. | Acre | $155.64 | 0.5 | $77.82 |
| **Mobilization** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 4 | $997.16 |

**Practice:** 654 - Road/Trail/Landing Closure and Treatment

**Scenario** #7 - Riparian Zone, >35% hillslope

**Scenario Description:**

The practice includes permanent road/trail/landing closure and treatment in riparian areas adjacent to a watercourse where heavy equipment is required and hillslopes are >35%. Treatment will reconnect hydrology of the hillslope to applicable drainage networks, and stabilize cuts and fills that have sedimentation potential to streams. Exposed soil is mulched and/or seeded (see associated practices 484-Mulching and 342-Critical Area Planting). The treatment will limit future access. Tree/Shrub Site Prep and Planting is not included, however it is recommended as an associated practice. When completed, there is no additional maintenance with heavy equipment needed. This practice addresses one or more resource concerns: Excessive Sediment in surface waters and Concentrated Flow Erosion. Since not all segments of the road/trail system may require this level of treatment, this scenario applies only to those segments that are causing the resource concerns. For landing sites, an additional road length may be added to the quantities to include the area of landing addressed assuming a 14' width (i.e. for a landing that is 50x50 sq ft, add 178' of road length to the total quantity). For landing sites, an additional road length may be added to the quantities to include the area of landing addressed assuming a 14' width (i.e. for a landing that is 50x50 sq ft, add 178' of road length to the total quantity).

**Before Situation:**

The legacy trail/road is severely affecting wetlands, riparian areas, stream ecosystems, unstable slopes, water quality, and possibly T&E species. The trail/road can no longer serve its intended use and is incapable of handling needed equipment and traffic. Alternative access was possible. Therefore abandonment and site restoration are the best approaches to address the resource concerns, regulatory issues, and problems that are being created.

**After Situation:**

The resource concerns are addressed by the abandonment of the road adjacent to watercourses, and its drainage elements, and by re-seeding to native grasses, forbs, and/or riparian plants. Road abandonment meets local, state, and federal regulatory requirements. The typical scenario includes decommissioning a 24-foot wide, earthen road with landings on forest slopes over 35%, using a bulldozer or other heavy equipment such as an excavator or road grader with ripper to re-shape and obliterate the road base and landings in order to re-establish slopes and site to pre-road conditions and to re-establish native vegetation. It also includes restoring hydrology with the removal of culverts and drainage fills as well as stabilize cuts and fills. Necessary erosion control measures such as out sloping and rolling dips are installed. The steep slopes in riparian zones make this scenario costly due to the increased time needed to apply the measures and the need for additional water and erosion control devices. Some hand-work may be necessary to clear the site for the equipment. Exposed soil surfaces near streams are mulched or covered with natural materials, such as slash or straw using associated practice 484-Mulching. The work will be supervised by a consultant forester, land manager, or other resource professional.

**Feature Measure:** length

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $8,547.25

**Scenario Cost/Unit:** $17.09

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 8 | $440.24 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 16 | $1,038.72 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 12 | $1,937.28 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 12 | $525.36 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 4 | $17.16 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 1 | $12.37 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 40 | $1,606.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 16 | $756.00 |
| **Materials** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| One Species, Cool Season, Native Perennial Grass | 2312 | Native, cool season perennial grass. Includes material and shipping only. | Acre | $155.64 | 0.5 | $77.82 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 655 - Forest Trails and Landings

**Scenario** #2 - Trail and Landing Installation

**Scenario Description:**

Construction of forest trails and landings for the purpose of providing access to a gently sloping forested tract, Access will allow the application of other conservation practices, monitoring and the removal of forest products, usually after a catastrophic event. It is not, however, to be used if the installation is done to enable a commercial operation such as timber harvesting. Installation will include removal of trees and brush as needed, a minimum amount of blading and soil disturbance, and the installing of substantial water control measures such as water bars, broad-based dips, wing ditches, out sloping, etc. It will not include long-term, permanent measures more common to access roads such as gravelling or ditching. Installation will be supervised by a consultant forester, land manager, or other resource professional. Resource concerns include Excessive sediment in surface waters, Sheet & rill erosion, and Concentrated flow erosion

**Before Situation:**

Access to the tract is not available for occasional travel by the landowner or manager for the purposes of monitoring, installing conservation practices and/or the removal of forest products. Improperly installed trails and landings will cause soil erosion and water quality problems.

**After Situation:**

A trail system is installed that provides access to the forested tract and does not cause excessive erosion or water quality concerns.

**Feature Measure:** Length of trail treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $4,928.52

**Scenario Cost/Unit:** $2.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 10 | $649.20 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 24 | $1,050.72 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 8 | $34.32 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 16 | $342.24 |
| Water Bars | 1500 | Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length. | Foot | $2.94 | 225 | $661.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 34 | $922.08 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 655 - Forest Trails and Landings

**Scenario** #5 - Trail Erosion Control w/o Vegetation, Slopes < 35%

**Scenario Description:**

Rehabilitation of existing forest access trail segments on a 20% slope and a 4% grade by addressing legacy resource issues for long-term use. Typically the trail is a single lane (18-foot wide, including cut and fill), seasonal prism requiring sustained erosion control measures installed by using heavy equipment such as dozers, graders, backhoes, and/or excavators. The purpose is to hydrologically disconnect the existing trail/landing system from streams and natural drainages. This scenario includes designing and installing measures such as cross drains, rock drains, relief drains, out sloping (or changing surface drainage), rolling dips and water bars and ditch outs as needed, and applies to only those segments of the trail system that have resource concerns requiring rehabilitation. Some hand work (chainsaw) will be needed to allow the use of the equipment. Installation will be supervised. Other practices such as Stream Crossing, and Critical Area Planting, Access Road, and Structure for Water Control can be adjacent/appurtenant but not part of this practice scenario. Treatments are for long-term reduction of sediment, restoration of fish habitat, creation of fire access, and the removal of routes off unstable slopes. Resource concerns include: Excessive sedimentation in surface waters, Concentrated flow erosion, Sheet and rill erosion, and Degradation of wildlife species.

**Before Situation:**

Trails are delivering sediment to waterways, impacting riparian areas and wetlands and possibly affecting T&E species. The system's usefulness for access is also being compromised by inadequate erosion and drainage control systems. However rehabilitation over abandonment is an acceptable course of action.

**After Situation:**

Trails and landings provide long-term access and do not adversely affect the resources concerns.

**Feature Measure:** Length of trail treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $7,855.57

**Scenario Cost/Unit:** $3.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 18 | $1,168.56 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 18 | $2,009.88 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 9 | $38.61 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 18 | $385.02 |
| Water Bars | 1500 | Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length. | Foot | $2.94 | 250 | $735.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 38 | $1,526.08 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 655 - Forest Trails and Landings

**Scenario** #6 - Trail Erosion Control w/o Vegetation, Slopes >35%

**Scenario Description:**

Rehabilitation of existing forest access trails and landings by addressing legacy resource issues such as sedimentation, for long-term use. Typically the trail is a single lane, existing 18-foot wide including cut and fill seasonal road prism on a moderately steep (45%) slope on forestland requiring sustained erosion control measures applied by using heavy equipment such as dozers, backhoes, graders, excavators, rock and rollers. The purpose is to hydrologically disconnect existing trail/landing system from the streams and natural drainages. This includes the design and installation of cross drains, rock drains, relief drains, out sloping (or changing road surface drainage), rolling dips and water bars and ditch outs as needed This scenario applies to only those segments of the trail system that have resource concerns requiring rehabilitation. A typical water bar or rolling dip installed in this scenario is on a 75 to 100 foot spacing with a depth of about 1 foot. A layer of aggregate rock is compacted into a 20 foot length of road around the deepest section of the dip. Some hand work (chainsaw) will be needed to allow the use of the equipment. The work will be supervised. Other practices such as Stream Crossing, and Critical Area Planting, Access Road and Structure for Water Control can be adjacent/appurtenant but not part of this practice scenario . Resource concerns include: Excessive sedimentation in surface waters, Concentrated flow erosion, Sheet and rill erosion, and Degradation of wildlife species.

**Before Situation:**

Trails are delivering sediment to waterways, impacting riparian/wetlands and/or possibly affecting fish/T&E species. The usefulness of the trail/landing system is being adversely affected by erosion.

**After Situation:**

Trails and landings provide access and do not adversely affect the resources concerns.

**Feature Measure:** Length of trail treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $14,105.87

**Scenario Cost/Unit:** $7.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 22 | $2,678.50 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 22 | $3,551.68 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 9 | $38.61 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 22 | $470.58 |
| Water Bars | 1500 | Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length. | Foot | $2.94 | 1000 | $2,940.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 24 | $681.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 48 | $1,927.68 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $19.64 | 20 | $392.80 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

**Practice:** 655 - Forest Trails and Landings

**Scenario** #9 - Temporary Stream Crossing

**Scenario Description:**

The design and installation of a temporary stream crossing that will meet the immediate forest management/conservation needs. Afterwards the crossing will be restored and stabilized. Improperly designed and/or installed stream crossings will, in the long term, adversely affect water quality and aquatic life. Approaches will also be stabilized for the use of the crossing and stabilized afterwards as necessary. Installation will be supervised. Permanent and/or high-traffic crossings will be designed and installed according to the Stream Crossing (578) Standard. Resource concerns include: Excessive sediment in surface waters and Habitat degradation.

**Before Situation:**

Access to a forested tract is not available for the installation of conservation practices or removal of forest products due to the lack of a suitable stream crossing(s).

**After Situation:**

Access was available to address other resource concerns/management needs and the stream is restored to its previous or better condition.

**Feature Measure:** Number of crossings

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,402.57

**Scenario Cost/Unit:** $1,402.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 2 | $223.32 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 2 | $87.56 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4 | $108.48 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 657 - Wetland Restoration

**Scenario** #1 - Tile Decommissioning

**Scenario Description:**

Wetland hydrology is restored by decommission a subsurface drain tile system. The Tract is removed from agricultural production. Any necessary planting will be contracted under Conservation Cover (327), Restoration of Rare and Declining Habitats (643), Wetland Wildlife Habitat Management (644). Earthwork for deleveling should be contracted under another 657 scenario or Wetland Wildlife Habitat Management (644) . Resource Concerns: SOIL QUALITY DEGRADATION - Organic matter depletion; WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, Pesticides transported to surface and ground waters, Excessive sediment in surface waters; DEGRADED PLANT CONDITION - Undesirable plant productivity and health; INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

The site has been drained with a tile drain system and is in agricultural production.

**After Situation:**

The drain tiles have been rendered non-functional by excavating at least 50 foot lengths of tile mains and laterals, and backfilling with excavated earth, which is compacted with the excavator bucket. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns.

**Feature Measure:** Acres of Tract

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $20,046.81

**Scenario Cost/Unit:** $501.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 32 | $1,970.88 |
| **Foregone Income** | | | | | | |
| FI, Wheat Irrigated | 1964 | Irrigated Wheat is Primary Crop | Acre | $418.29 | 40 | $16,731.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 32 | $867.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 657 - Wetland Restoration

**Scenario** #2 - Levee or Dike Removal

**Scenario Description:**

Wetland hydrology is restored by removing a levee or dike. The Tract is removed from agricultural production. Any necessary planting will be contracted under Conservation Cover (327), Restoration of Rare and Declining Habitats (643), Wetland Wildlife Habitat Management (644), Tree and Shrub Establishment (612). Earthwork for deleveling should be contracted under another 657 scenario or Wetland Wildlife Habitat Management (644), or Grade Stabilization Structure (410). Resource Concerns: SOIL QUALITY DEGRADATION - Organic matter depletion; WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, Pesticides transported to surface and ground waters, Excessive sediment in surface waters; DEGRADED PLANT CONDITION - Undesirable plant productivity and health; INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

A levee and/or dike prevents floodwater from entering the tract. Hydrology that once supported wetlands is now diverted and the Tract is in agricultural production. Average dike size is 5' height, 10' width, 2:1 sideslopes.

**After Situation:**

The levee/dike has been removed and the hydrology of the site is restored. Excavated spoil is placed adjacent to the features on the wetland and adjacent non-wetland area with a maximum depth of 24 inches. Facilitating practices may include Grade Stabilization Structure and Tree and Shrub Planting. Restoration of hydrology and plant community functions improve the water quality, soil quality, plant condition, and improve habitat for fish and wildlife.

**Feature Measure:** Acres of Tract

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $89,297.66

**Scenario Cost/Unit:** $2,232.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 80 | $15,247.20 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.21 | 9778 | $41,165.38 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $56.50 | 80 | $4,520.00 |
| **Foregone Income** | | | | | | |
| FI, Wheat Irrigated | 1964 | Irrigated Wheat is Primary Crop | Acre | $418.29 | 40 | $16,731.60 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 160 | $6,425.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 80 | $3,780.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 3 | $1,427.88 |

**Practice:** 657 - Wetland Restoration

**Scenario** #3 - Estuarine Levee Removal

**Scenario Description:**

Wetland hydrology is restored by removing a levee or dike. This scenario is for use on Tracts subject to tidally induced water fluctuations. The Tract is removed from agricultural production. Any necessary planting will be contracted under Conservation Cover (327), Restoration of Rare and Declining Habitats (643), Wetland Wildlife Habitat Management (644), Tree and Shrub Establishment (612). Earthwork for deleveling should be contracted under another 657 scenario or Wetland Wildlife Habitat Management (644), or Grade Stabilization Structure (410). Resource Concerns: SOIL QUALITY DEGRADATION - Organic matter depletion; WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, Pesticides transported to surface and ground waters, Excessive sediment in surface waters; DEGRADED PLANT CONDITION - Undesirable plant productivity and health; INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

The wetland has been converted to agricultural production by construction of a dike to prevent tidal flows. The dike has a culvert with a flapgate to allow surface water to flow out, but prevents tide water from entering. Average dike size is 8 feet high above the current marsh surface. The dike has side slopes of 2:1, with a 12 foot top.

**After Situation:**

The levee/dike has been removed and the hydrology of the site is restored. Excavated spoil is placed adjacent to the features on the wetland and adjacent non-wetland area with a maximum depth of 24 inches. Facilitating practices may include Grade Stabilization Structure and Tree and Shrub Planting. Restoration of hydrology and plant community functions improve the water quality, soil quality, plant condition, and improve habitat for fish and wildlife.

**Feature Measure:** Acres of Tract

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $215,257.82

**Scenario Cost/Unit:** $5,381.45

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 160 | $19,480.00 |
| Excavation, clay, large equipment, 1500 ft | 1217 | Bulk excavation of clay with scrapers with average haul distance of 1500 feet. Includes equipment and labor. | Cubic Yard | $6.41 | 16427 | $105,297.07 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.21 | 5475 | $23,049.75 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $119.42 | 320 | $38,214.40 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 480 | $19,276.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 160 | $7,560.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 5 | $2,379.80 |

**Practice:** 657 - Wetland Restoration

**Scenario** #4 - Ditch Plug

**Scenario Description:**

Wetland hydrology is restored by plugging ditches that are draining surface hydrology and channelizing overland flow. Typical scenario is for four ditch plugs on a 40 acre wetland. The Tract is removed from agricultural production. Any necessary planting will be contracted under Conservation Cover (327), Restoration of Rare and Declining Habitats (643), Wetland Wildlife Habitat Management (644), Tree and Shrub Establishment (612). Earthwork for deleveling should be contracted under another 657 scenario or Wetland Wildlife Habitat Management (644), or Grade Stabilization Structure (410). Resource Concerns: SOIL QUALITY DEGRADATION - Organic matter depletion; WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, Pesticides transported to surface and ground waters, Excessive sediment in surface waters; DEGRADED PLANT CONDITION - Undesirable plant productivity and health; INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

The wetland has been converted to agricultural production, and the tract drained with a surface ditch. The ditch is 4' average depth, and 12 feet average width.

**After Situation:**

The ditch has been plugged by the installation of a 50' long section of compacted clay fill, and the deposition has been removed down to the original topsoil layer. A herbaceous plant community has been seeded. Facilitative practices include Conservation Cover. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns.

**Feature Measure:** Acres of Tract

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $23,588.90

**Scenario Cost/Unit:** $589.72

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 16 | $3,049.44 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $119.42 | 16 | $1,910.72 |
| **Foregone Income** | | | | | | |
| FI, Wheat Irrigated | 1964 | Irrigated Wheat is Primary Crop | Acre | $418.29 | 40 | $16,731.60 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 16 | $642.56 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 16 | $756.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 657 - Wetland Restoration

**Scenario** #5 - Deleveling

**Scenario Description:**

A 100 acre tract is removed from agricultural production and restored to a depressional wetland or depressional wetland complex. Typical scenario is for 2 scrapers and 1 dozer creating shallow (6-24 inch) depressional areas. May be used in combination with a level removal or ditch plug scenario of this same practice. Other facilitating practices may include: fence (382), wetland wildlife habitat management (644), critical area planting (342), conservation cover (327), pumping plant (533), tree and shrub establishment (612), herbaceous weed control (315), dike (356). Resource Concerns: SOIL QUALITY DEGRADATION - Organic matter depletion; WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, Pesticides transported to surface and ground waters, Excessive sediment in surface waters; DEGRADED PLANT CONDITION - Undesirable plant productivity and health; INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

The wetland has been converted to agricultural production through land leveling and smoothing, or other diversion of water. Wetlands may have received sediment deposition to alter the microtopography. Tract may or may not be irrigated.

**After Situation:**

The "natural" topography of the parcel has been restored through deleveling or sediment removal from historic basins. The parcel is removed from agricultural production and planted to native wetland vegetation. Restoration of hydrology and plant community functions improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns.

**Feature Measure:** Acres of Tract

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $141,560.28

**Scenario Cost/Unit:** $1,415.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 120 | $14,610.00 |
| Scraper, self propelled, 21 CY | 1208 | Self propelled earthmoving scraper with 21 CY capacity. Does not include labor. | Hour | $369.43 | 240 | $88,663.20 |
| **Foregone Income** | | | | | | |
| FI, Wheat Irrigated | 1964 | Irrigated Wheat is Primary Crop | Acre | $418.29 | 40 | $16,731.60 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 360 | $14,457.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 120 | $5,670.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 3 | $1,427.88 |

**Practice:** 657 - Wetland Restoration

**Scenario** #6 - Riverine Channel and Slough Restoration

**Scenario Description:**

A 100 acre tract is removed from agricultural production and restored to a depressional wetland or depressional wetland complex. Typical scenario is for 1 scrapers and 2 dozers creating and restoring historic sloughs and channels. May be used in combination with a levee removal or ditch plug scenario of this same practice. Other facilitating practices may include: fence (382), wetland wildlife habitat management (644), critical area planting (342), conservation cover (327), pumping plant (533), tree and shrub establishment (612), herbaceous weed control (315), dike (356). Resource Concerns: SOIL QUALITY DEGRADATION - Organic matter depletion; WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, Pesticides transported to surface and ground waters, Excessive sediment in surface waters; DEGRADED PLANT CONDITION - Undesirable plant productivity and health; INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

The wetland has been converted to agricultural production through land leveling and smoothing, or other diversion of water. Wetland channels were filled. Tract may or may not be irrigated.

**After Situation:**

The "natural" topography of the parcel has been restored through excavation of historic channels. The parcel is removed from agricultural production and planted to native wetland vegetation. Restoration of hydrology and plant community functions improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns.

**Feature Measure:** Acres of Tract

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $190,191.28

**Scenario Cost/Unit:** $1,901.91

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 320 | $60,988.80 |
| Scraper, self propelled, 21 CY | 1208 | Self propelled earthmoving scraper with 21 CY capacity. Does not include labor. | Hour | $369.43 | 160 | $59,108.80 |
| **Foregone Income** | | | | | | |
| FI, Wheat Irrigated | 1964 | Irrigated Wheat is Primary Crop | Acre | $418.29 | 100 | $41,829.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 480 | $19,276.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 160 | $7,560.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 3 | $1,427.88 |

**Practice:** 657 - Wetland Restoration

**Scenario** #7 - Complex Restoration

**Scenario Description:**

Wetland hydrology is restored by removing a levee or dike, deleveling project area, and channel/slough restoration. This scenario is to be used when more than one restoration technique is required on the same area. The Tract is removed from agricultural production. Any necessary planting will be contracted under Conservation Cover (327), Restoration of Rare and Declining Habitats (643), Wetland Wildlife Habitat Management (644), Tree and Shrub Establishment (612). Resource Concerns: SOIL QUALITY DEGRADATION - Organic matter depletion; WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, Pesticides transported to surface and ground waters, Excessive sediment in surface waters; DEGRADED PLANT CONDITION - Undesirable plant productivity and health; INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

The parcel has been leveled/smoothed to remove natural topography, channels have been filled, and a levee and/or dike prevents floodwater from entering the tract. Hydrology that once supported wetlands is now diverted and the Tract is in agricultural production. Average dike size is 5' height, 10' width, 2:1 sideslopes.

**After Situation:**

The "natural" topography of the parcel has been restored through deleveling, sediment removal from historic basins and channel/slough restoration. The parcel is removed from agricultural production and planted to native wetland vegetation. The levee/dike has been removed and the hydrology of the site is restored. Excavated spoil is placed adjacent to the features on the wetland and adjacent non-wetland area with a maximum depth of 24 inches. Facilitating practices may include Grade Stabilization Structure and Tree and Shrub Planting. Restoration of hydrology and plant community functions improve the water quality, soil quality, plant condition, and improve habitat for fish and wildlife.

**Feature Measure:** Acres of Tract

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $499,943.70

**Scenario Cost/Unit:** $4,999.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 320 | $38,960.00 |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 400 | $76,236.00 |
| Scraper, self propelled, 21 CY | 1208 | Self propelled earthmoving scraper with 21 CY capacity. Does not include labor. | Hour | $369.43 | 560 | $206,880.80 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.21 | 9778 | $41,165.38 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $56.50 | 240 | $13,560.00 |
| **Foregone Income** | | | | | | |
| FI, Wheat Irrigated | 1964 | Irrigated Wheat is Primary Crop | Acre | $418.29 | 100 | $41,829.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 64 | $1,817.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 1520 | $61,043.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 320 | $15,120.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 7 | $3,331.72 |

**Practice:** 659 - Wetland Enhancement

**Scenario** #1 - Simple, Small Project

**Scenario Description:**

A former or degraded wetland area is to be enhanced beyond the original (historic) conditions. The typical size is 15 acres of wetland as the actual project area. Small/simple Scenario is based on average 12" of excavation from 5 acres within the larger 15 ac project area to increase the depth and duration of surface hydrology for portions of the project area. Excavation may be in one or more areas, not exceeding 36" depth. Project may include removing soil material and/or deepening existing wetlands and swales. Enhancement activities will improve habitat for wetland dependent wildlife species requiring additional hydrology for all or portions of their life cycles. This activity is not appropriate for natural well functioning wetlands or wetlands. Additional review from State Biologist is required in areas where the hydrology is dominated by groundwater (HGM Class = Slope) or where hydrology is perched due to shallow restrictive layers in the soil. Facilitating practices may include those to establish vegetation or water control/pumping structures. Resource Concerns are: WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, WATER QUALITY DEGRADATION - Excessive sediment in surface waters, DEGRADED PLANT CONDITION - Undesirable plant productivity and health, DEGRADED PLANT CONDITION, Inadequate structure and composition, INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

The site lacks sufficient micro- and macrotopographic features needed for a specific wetland habitat for target wildlife species. Typically the site has been previously manipulated and utilized for agricultural, livestock or forest production. Original (historic) conditions are not sufficient to support the species specific wildlife objectives. Enhancement possibilities of the site is relatively simple and small in size.

**After Situation:**

Appropriate equipment were used to modify a wetland area and construct planned topographic features essential for identified species. As a result of the installation, the topographic relief needed to provide the varied wetland wildlife habitat needs is provided.

**Feature Measure:** Acres of Project

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $43,175.96

**Scenario Cost/Unit:** $2,878.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 8066 | $28,956.94 |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $190.59 | 13.33 | $2,540.56 |
| **Foregone Income** | | | | | | |
| FI, Corn Irrigated | 1960 | Irrigated Corn is Primary Crop | Acre | $473.54 | 5 | $2,367.70 |
| FI, Wheat Irrigated | 1964 | Irrigated Wheat is Primary Crop | Acre | $418.29 | 5 | $2,091.45 |
| FI, Vegetables | 2033 | Vegetables is Primary Crop | Acre | $1,111.11 | 5 | $5,555.55 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 13.33 | $535.33 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 13.33 | $629.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 659 - Wetland Enhancement

**Scenario** #2 - Moderate Project

**Scenario Description:**

A former or degraded wetland area is to be enhanced beyond the original (historic) conditions. The typical size is 30 acres of wetland as the actual project area. the Moderate Project Scenario is based on average 12"-24" of excavation from 30 ac project area to increase the depth and duration of surface hydrology for portions of the project area. Project may include removing soil material and/or deepening existing wetlands and swales of varying depth and type. Enhancement activities will improve habitat for wetland dependent wildlife species requiring additional hydrology for all or portions of their life cycles. This activity is not appropriate for natural well functioning wetlands. Additional review from State Biologist is required in areas where the hydrology is dominated by groundwater (HGM Class = Slope) or where hydrology is perched due to shallow restrictive layers in the soil. Facilitating practices may include those to establish vegetation or water control/pumping structures. Resource Concerns are: WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, WATER QUALITY DEGRADATION - Excessive sediment in surface waters, DEGRADED PLANT CONDITION - Undesirable plant productivity and health, DEGRADED PLANT CONDITION, Inadequate structure and composition, INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

Wetland areas on the site still exist but have been previously manipulated and utilized for agriculture, livestock, or forest production. Swales and wetland areas are degraded due to sedimentation and improper agricultural management practices. The functions and values of the wetlands can be enhanced by improving micro- and macrotopographic features needed for a specific wetland habitat for target wildlife species. Current conditions are not sufficient to support the species specific wildlife objectives.

**After Situation:**

Wetland areas on the site are removed from agriculture, livestock, or forest production. The functions and values of the wetlands are enhanced by improving micro- and macrotopographic features needed for a specific wetland habitat for target wildlife species. Enhanced conditions are sufficient to support the species specific wildlife objectives.

**Feature Measure:** Acres of Project

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $115,827.78

**Scenario Cost/Unit:** $3,860.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 24000 | $86,160.00 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 60 | $3,895.20 |
| **Foregone Income** | | | | | | |
| FI, Corn Irrigated | 1960 | Irrigated Corn is Primary Crop | Acre | $473.54 | 10 | $4,735.40 |
| FI, Wheat Irrigated | 1964 | Irrigated Wheat is Primary Crop | Acre | $418.29 | 10 | $4,182.90 |
| FI, Vegetables | 2033 | Vegetables is Primary Crop | Acre | $1,111.11 | 10 | $11,111.10 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 60 | $2,409.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 60 | $2,835.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 659 - Wetland Enhancement

**Scenario** #3 - Complex Project

**Scenario Description:**

A former or degraded wetland area is to be enhanced beyond the original (historic) conditions. The typical size is 30 acres of wetland as the actual project area. Complex projects may include removing depositional soil material and/or enhancing existing depressional, slope, and/or wetland/upland mosaic landscapes. Site specific complexities (such as accessibility or excessive wetness) exist. Scenario based on 12"-36" of excavation from 30 ac project area to increase the depth and duration of surface hydrology for portions of the project area. Enhancement activities will improve habitat for wildlife species requiring wetlands for all or portions of their life cycles. This activity is not appropriate for natural well functioning wetlands. Additional review from State Biologist is required in areas where the hydrology is dominated by groundwater (HGM Class = Slope) or where hydrology is perched due to shallow restrictive layers in the soil. Facilitating practices may include those to establish vegetation or water control/pumping structures. Resource Concerns are: WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, WATER QUALITY DEGRADATION - Excessive sediment in surface waters, DEGRADED PLANT CONDITION - Undesirable plant productivity and health, DEGRADED PLANT CONDITION, Inadequate structure and composition, INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

Wetland areas on the site still exist but have been previously manipulated and utilized for agriculture, livestock, or forest production. Swales and wetland areas are degraded due to sedimentation and improper agricultural management practices. The functions and values of the wetlands can be enhanced by improving micro- and macrotopographic features needed for a specific wetland habitat for target wildlife species. Current conditions are not sufficient to support the species specific wildlife objectives.

**After Situation:**

Wetland areas on the site are removed from agriculture, livestock, or forest production. The functions and values of the wetlands are enhanced by improving micro- and macrotopographic features needed for a specific wetland habitat for target wildlife species. Enhanced conditions are sufficient to support the species specific wildlife objectives.

**Feature Measure:** Acres of Project

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $147,594.38

**Scenario Cost/Unit:** $4,919.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 32000 | $114,880.00 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 80 | $5,193.60 |
| **Foregone Income** | | | | | | |
| FI, Corn Irrigated | 1960 | Irrigated Corn is Primary Crop | Acre | $473.54 | 10 | $4,735.40 |
| FI, Wheat Irrigated | 1964 | Irrigated Wheat is Primary Crop | Acre | $418.29 | 10 | $4,182.90 |
| FI, Vegetables | 2033 | Vegetables is Primary Crop | Acre | $1,111.11 | 10 | $11,111.10 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 80 | $3,212.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 80 | $3,780.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #1 - Fire Hazard

**Scenario Description:**

Pruning trees of branches in a forest stand where wildfires are considered a high and very high hazard. Hand tools and power tools are used to cut branches from trees. If slash treatment is needed, refer to associated practice 384-Woody Residue Treatment. Resource concerns include Degraded plant condition-wildfire hazard and Undesirable plant productivity and health.

**Before Situation:**

The forest stand is well to over-stocked, generally with 200 to 300+ trees per acre. Branches are touching understory vegetation or are in close proximity to forest floor where a ground fire can ignite the lower branches and move into the upper canopy. Wildfire hazard is very high.

**After Situation:**

The typical forest pruning treatment is 20 acres. Trees are pruned to the desirable height (generally 8-16') based on desired separation space between ground vegetation and tree crown. Pruned branches are treated if they are a hazard, see Woody Residue Treatment standard.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $6,818.90

**Scenario Cost/Unit:** $340.95

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 120 | $514.80 |
| Pruning tool, pole saw | 1319 | Gasoline powered pole chainsaw. Labor not included. | Hour | $8.54 | 40 | $341.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 180 | $5,112.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 18 | $850.50 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #2 - Stand Improvement, Low Height, 10ft or less

**Scenario Description:**

Branches are pruned from trees to a height of 8-10 feet to improve the quality of the stem wood. Pruning is done by hand with chain saws, tree loppers, hand shears, or hand saws. Trees are identified for pruning. Trees are growing at a fast pace, with leader growth on trees anywhere from 1.5 feet to 4 feet in length. For treatment of slash, refer to associated practice 384-Woody Residue Treatment. Degraded plant condition - undesirable plant productivity and health is the resource concern.

**Before Situation:**

Trees are retaining lower limbs along the entire tree bole, reducing wood quality. Pruning height will be based on overall stand diameter and height. Stand has been thinned and crop trees are identified for pruning. Degrade plant condition- undesirable plant productivity and health is the resource concern.

**After Situation:**

The typical forest pruning treatment is 20 acres. Trees are pruned to the desirable height of 8-10 feet. Pruned branches are treated if they are a hazard, see Woody Residue Treatment standard.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $4,442.55

**Scenario Cost/Unit:** $222.13

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 80 | $343.20 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 20 | $101.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 110 | $3,124.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 17 | $803.25 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 10 | $70.70 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #3 - Stand Improvement, High Height, >10ft

**Scenario Description:**

Branches are pruned from trees up to a height of 18 feet or more to improve the quality of the stem wood. Pruning is done by hand with pole saws or with gas pole saw. Crop trees are identified for pruning. The forest is on highly productive soils. Trees are growing at a fast pace, with leader growth on trees anywhere from 1.5 feet to 4 feet in length. If slash treatment is needed, refer to associated practice 384-Woody Residue Treatment. Degrade plant condition - undesirable plant productivity and health is the resource concern.

**Before Situation:**

Trees are retaining limbs mostly along the mid to upper section of the tree bole, reducing quality. Lower branches (0-8 feet) may have already been pruned, have naturally self pruned to differing heights. Pruning height is at least to eighteen (18) feet above the ground. Degrade plant condition- undesirable plant productivity and health is the resource concern.

**After Situation:**

The typical forest pruning treatment is 20 acres. Trees are pruned to the height of 18 feet or more. Pruned branches are treated so they do not become a fire or health hazard.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $9,913.10

**Scenario Cost/Unit:** $495.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 10 | $42.90 |
| Pruning tool, pole saw | 1319 | Gasoline powered pole chainsaw. Labor not included. | Hour | $8.54 | 200 | $1,708.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 235 | $6,674.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 30 | $1,417.50 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 10 | $70.70 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #4 - Wildlife, Mast Increase

**Scenario Description:**

Pruning of hard/soft mast trees and shrubs to stimulate increased fruit/nut production and for wildlife food. Selected trees (roughly 10 per acre) are re-invigorated with new branching and an increase in mast production. Primarily done around old agricultural fields, in old orchards, or in forested areas. Is usually done with a chainsaw or handsaw to open the canopy and remove dead branches to increase airflow and sunlight penetration. Resource concerns are inadequate habitat for fish and wildlife - habitat degradation and plant condition- undesirable plant productivity and health

**Before Situation:**

Trees have reduced mast production due to tree reaching maturity or heavy shade. Pruning is needed to remove older branches, dead material and increase sunlight into the canopy. New branching will be stimulated, increasing mast production.

**After Situation:**

Selected trees (10 per acre) are re-invigorated with new branching and an increase in mast production.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $592.65

**Scenario Cost/Unit:** $296.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 5 | $21.45 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 10 | $50.70 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 15 | $426.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #5 - Multistory Cropping, Understory, Erosion Concerns

**Scenario Description:**

Pruning trees and/or shrubs is accomplished to extend the lifespan and productivity of trees and or shrubs. Pruning reduces the time periods of replacement by 2/3rds, exposing less bare soil. Soil erosion and sedimentation is a great concern if trees or shrubs are removed. Pruning is accomplished by hand with hand tools and/or chainsaw. Trees and or shrubs are growing where the average rainfall is very high, with cooler temperatures and deep steep soils. Resource concerns are degraded plant condition-undesirable plant productivity and health, soil erosion-sheet and rill.

**Before Situation:**

Trees and/or shrubs are showing signs of reduced health (thinning crowns/less branching) and fruit production. Loss of trees or shrubs will occur within a few years. Severe soil erosion and sedimentation is a great concern if trees or shrubs are removed.

**After Situation:**

Tree/shrub pruning is completed on trees and/or shrubs. Cut vegetative material is left on the ground providing cover, and increasing organic matter.

**Feature Measure:** individual tree/shrub pruned

**Scenario Unit::** Each

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $933.28

**Scenario Cost/Unit:** $1.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 10 | $42.90 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 4 | $20.28 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 14 | $397.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #6 - Multistory Cropping, Overstory

**Scenario Description:**

Overstory tree crowns are pruned to increase desirable growth and sunlight to understory shrubs and low growing trees that have been purposely established to grow on the same acre of ground. Resource concern is degraded plant condition - undesirable plant productivity and health and wildlife habitat degradation. Associated Practice 384-Woody Residue Treatment

**Before Situation:**

The overstory trees are expanding their crowns, providing to much shade on the understory plants. The shade is affecting the growth and production of the understory plants. Pruning of branches, leaves, frawns, etc. are needed to maintain the desired amount of sunlight reaching the understory.

**After Situation:**

Pruning of the overstory tree crowns is completed, allowing the proper amount of sunlight to reach the understory vegetation, maintaining their growth, health and vigor, and wildlife benefits.

**Feature Measure:** Overstory Trees Pruned

**Scenario Unit::** Each

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $1,194.30

**Scenario Cost/Unit:** $9.95

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 10 | $42.90 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $5.07 | 8 | $40.56 |
| Pruning tool, pole saw | 1319 | Gasoline powered pole chainsaw. Labor not included. | Hour | $8.54 | 6 | $51.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 24 | $681.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #1 - Pre-commercial Thinning, Hand tools, Light

**Scenario Description:**

Adjusting the stocking of a young, non-merchantable, light stand of trees. A light stand is one that has up to 500 TPA on slopes less than 35%. The operation is supervised by a forester and is carried out using hand tools such as chainsaws. Additional treatment of slash is not normally needed, except in high wildfire hazard areas. In cases where additional treatment of slash is needed, refer to associated practice Woody Residue Treatment (384). Resource concerns include Undesirable plant productivity and health; Wildfire hazard; and Inadequate structure and composition; and Wildlife habitat degradation.

**Before Situation:**

The stocking of a stand of trees that are too small to make a commercial thinning exceeds the recommended fully stocked level for the species and site. The effect is much slower growth than is reasonable or expected for the site, increased susceptibility to insects and disease, and an unacceptable devastating wildfire risk.

**After Situation:**

After adjusting the stocking to an acceptable level using hand tools such as chainsaws, stand growth, condition, and overall quality is improved. In addition, wildlife habitat is improved with the resulting increase of sunlight reaching the forest floor.

**Feature Measure:** Area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,891.04

**Scenario Cost/Unit:** $289.10

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 30 | $128.70 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 10 | $213.90 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 42 | $1,192.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #2 - Pre-commercial Thinning, Hand tools, Heavy

**Scenario Description:**

Adjusting the stocking of a young, non-merchantable, heavy stand of trees. Heavy stand is a stand that has 300-500 Trees per Acre (TPA) on slopes greater than 35%, or any stands with greater than 500 TPA. The operation is supervised by a forester and is carried out using hand tools such as chainsaws. When additional treatment of slash is needed, refer to associated practice Woody Residue Treatment (384). Resource concerns include Undesirable plant productivity and health; Wildfire hazard; and Inadequate structure and composition; and Wildlife habitat degradation.

**Before Situation:**

The stocking of a stand of trees that are too small to make a commercial thinning exceeds the recommended fully stocked level for the species and site. The effect is much slower growth than is reasonable or expected for the site, increased susceptibility to insects and disease, and an unacceptable devastating wildfire risk.

**After Situation:**

Chainsaws are used, but the topography and/or density of the stand requires more time to complete the task compared to less dense stands on more level terrain. After adjusting the stocking to an acceptable level, stand growth, condition, and overall quality is improved. In addition, wildlife habitat is improved with the resulting increase of sunlight reaching the forest floor.

**Feature Measure:** Area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $4,592.34

**Scenario Cost/Unit:** $459.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 60 | $257.40 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 12 | $256.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 72 | $2,044.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 18 | $2,033.46 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #3 - Timber Stand Improvement, Single Stem Treatment

**Scenario Description:**

Altering the composition and stocking of a stand of trees by means of individual stem treatment such as injection, basal bark spraying, or hack and squirt. The trees to be retained are marked by a forester. Resource concerns include: Undesirable plant productivity and health; Wildlife habitat degradation; Wildfire hazard; and Inadequate structure and composition.

**Before Situation:**

The existing condition of the stand cannot meet the landowners objectives because the composition consists of unwanted species and the stocking exceeds the recommended level. The species and quality of the trees to be controlled makes a commercial operation unfeasible; therefore single stem treatment is necessary.

**After Situation:**

The composition of the stand can meet the landowners objectives and the growth, condition and quality of the remaining trees is improved. Stand improvement is carried out with single stem treatment such as injection, hack and squirt, and/or basal bark spraying.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,557.46

**Scenario Cost/Unit:** $555.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 45 | $2,866.95 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 21 | $2,372.37 |
| **Materials** | | | | | | |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.98 | 10 | $189.80 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #4 - Timber Stand Improvement, Chemical, Ground

**Scenario Description:**

Using ground applied chemicals to release young desirable trees from competing and/or overtopping vegetation. Typically half the acres are accessible for over-the-top type ground treatment and the other half will utilize spot treatments. Resource concerns addressed include: Undesirable plant productivity and health, and wildlife habitat degradation.

**Before Situation:**

An adequately stocked stand of desirable species and trees is not growing to its potential for the site due to severe competition from undesirable trees and brush.

**After Situation:**

The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns. Releasing the desirable trees from the competition will be achieved through the application of appropriate herbicides according to label directions. Application will be by ground equipment as an over-the-top spray.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $5,167.06

**Scenario Cost/Unit:** $129.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 20 | $120.40 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 44 | $2,803.24 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 6 | $677.82 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 40 | $1,513.20 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 40 | $52.40 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #6 - Competition Control, Mechanical, Light Equipment

**Scenario Description:**

Using mixed equipment such as a tractor with brush hog and light masticator work to control vegetation that is competing with desirable trees species or to reduce the stocking level of a stand of desirable trees. When additional treatment of slash is needed, refer to associated practice Woody Residue Treatment (384). If the equipment being used for the removal of the competing vegetation or undesirable cut trees also chips or mulches the woody debris created by that treatment, then 384-Woody Residue Treatment may not be needed as an associated practice. Resource concerns include Undesirable plant productivity and health; Wildlife habitat degradation; Wildfire hazard; and Inadequate structure and composition.

**Before Situation:**

A stand of young, desirable trees is adversely affected by competition either from undesirable species or because the stand is overstocked. The vegetation to be controlled is small enough that it can be mowed or shredded. The work can be done by shredding strips through the stand.

**After Situation:**

After adjusting the stocking to an acceptable level and/or controlling the competing vegetation, stand growth, condition, and overall quality is improved. In addition, wildlife habitat is improved with the resulting increase of sunlight reaching the forest floor.

**Feature Measure:** Area Treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $6,818.76

**Scenario Cost/Unit:** $681.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 48 | $4,155.84 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.16 | 10 | $201.60 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 54 | $1,464.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 14 | $661.50 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #7 - Competition Control, Mechanical, Heavy Equipment

**Scenario Description:**

Using equipment such as a masticator and mulcher to control vegetation that is competing with desirable trees species or to reduce the stocking level of a stand of desirable trees. The trees to be retained will be marked by a forester. In addition to mechanical treatment, on-ground labor will be utilized to meet prescription. When additional treatment of slash is needed, refer to associated practice Woody Residue Treatment (384). If the equipment being used for the removal of the competing vegetation or undesirable cut trees also chips or mulches the woody debris created by that treatment, then 384-Woody Residue Treatment may not be needed as an associated practice. Resource concerns include: Undesirable plant productivity and health; Wildlife habitat degradation; Wildfire hazard; and Inadequate structure and composition.

**Before Situation:**

A stand of desirable trees is adversely affected by competition either from undesirable species, cull trees, or because the stand is overstocked. The vegetation to be controlled is too large to be mowed or shredded. Therefore other mechanical methods such as using masticators or mulchers is necessary.

**After Situation:**

The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns.

**Feature Measure:** Area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $10,832.85

**Scenario Cost/Unit:** $1,083.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 40 | $171.60 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 70 | $6,060.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 45 | $1,278.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 80 | $2,169.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #8 - Creating Patch Openings

**Scenario Description:**

Creating small open patches (typically less than 2 acres) in even aged and/or degraded stands using hand tools such as chainsaws. For treatment of resulting slash, use associated practice of Woody Residue Treatment (384). Resource concerns include: Inadequate structure and composition, Undesirable plant productivity and health, and wildlife habitat degradation.

**Before Situation:**

The existing stand is an even-aged stand and/or has been degraded in value by past harvesting practices. The present form, species composition and structure cannot meet the resource concerns of wildlife habitat, plant health and vigor.

**After Situation:**

A multi-aged/multi-storied stand of desirable species is established. In addition, early successional wildlife habitat as well as forest type diversity are created. The work will be done primarily with chainsaws to create small openings by cutting all trees and other woody vegetation.

**Feature Measure:** Area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $1,174.08

**Scenario Cost/Unit:** $587.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 16 | $68.64 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #9 - Wildlife Fire and Forest Health, Small Stem

**Scenario Description:**

A combination of hand and chemical treatments used to open the canopy of a stand to improve the wildlife habitat and tree health. Early encroachment of stands that are 0-4" DBH (diameter-breast-height); 300-800 TPA (trees per acre). Under the supervision of a forester, the area will be marked for appropriate treatment that will include cutting with hand tools (chainsaws), very light equipment (skidsteers, etc.) and/or injection. When additional treatment of slash is needed, refer to associated practice Woody Residue Treatment (384). Resource concerns include: Degraded plant condition - Inadequate structure and composition, Undesirable plant productivity and health, Wildfire hazard; and Wildlife habitat degradation.

**Before Situation:**

The stand of mature trees is overstocked resulting in a closed canopy. This condition is causing a lack of structure, herbaceous layer, and diversity that is needed to meet the landowner's objectives for improved wildlife habitat and forest health.

**After Situation:**

The stand is treated to favor diversity of important commercial and wildlife species. The canopy is opened to the extent necessary to promote herbaceous growth and the work is performed without excessive damage to the residual trees and site. Costs involved in any commercial harvesting including marking, access, and transportation are not included in this scenario. However the costs involved in marking trees to be treated or left and supervising the work is included.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $11,192.33

**Scenario Cost/Unit:** $1,119.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 30 | $1,313.40 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 60 | $257.40 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 40 | $2,548.40 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 30 | $832.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 68 | $1,931.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 34 | $922.08 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 24 | $2,711.28 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 10 | $70.70 |
| Herbicide, Triazine | 1321 | Broad spectrum herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $43.74 | 10 | $437.40 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #10 - Wildlife Fire and Forest Health, Large Stem

**Scenario Description:**

A combination of hand, equipment, and chemical treatments used to open the canopy of a stand to improve the wildlife habitat and tree health. Encroachment of stands that are 4-8" DBH; 300-600 TPA. Under the supervision of a forester, the area will be marked for appropriate treatments that will include cutting with hand tools (chainsaws), mechanical equipment (chopper, masticator), and/or injection. When treatment of slash is needed, refer to associated practice Woody Residue Treatment (384). If the equipment being used for the removal of the competing vegetation or undesirable cut trees also chips or mulches the woody debris created by that treatment, then 384-Woody Residue Treatment may not be needed as an associated practice. Resource concerns include: Degraded plant condition - Inadequate structure and composition, Undesirable plant productivity and health, Wildfire hazard; and Wildlife habitat degradation.

**Before Situation:**

The stand of mature trees is overstocked resulting in a closed canopy. This condition is causing a lack of structure, herbaceous layer, and diversity that is needed to meet the landowner's objectives for improved wildlife habitat and forest health.

**After Situation:**

The stand is treated to favor diversity of important commercial and wildlife species. The canopy is opened to the extent necessary to promote herbaceous growth and the work is performed without excessive damage to the residual trees and site. Costs involved in any commercial harvesting including marking, access, and transportation are not included in this scenario. However the costs involved in marking trees to be treated or left and supervising the work is included.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $14,324.58

**Scenario Cost/Unit:** $1,432.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 30 | $128.70 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 40 | $3,463.20 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 40 | $2,548.40 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 16 | $444.16 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 38 | $1,079.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 44 | $1,767.04 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 34 | $3,840.98 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 10 | $70.70 |
| Herbicide, Triazine | 1321 | Broad spectrum herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $43.74 | 10 | $437.40 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #11 - Wildlife and Forest Health, Dense Woodlands

**Scenario Description:**

Historic Oak Woodland and other threatened habitats that have become grossly overstocked with unwanted woody species approaching 400-800 trees per acre and ranging from 2-16+"dbh with closed or dense and entangled canopy will be thinned to stands of 40-120 trees per acre. Careful handling of cut material will ensure the remaining stand is damage-free. Refer to associated practice, Woody Residue Treatment (384), if treatment of resulting slash is needed. Treatments will address resource concerns to reduce wildfire hazard, improve wildlife habitat, improve structure and composition of the forest, and improve forest health.

**Before Situation:**

The stand of oaks is grossly overstocked resulting in a closed canopy dominated by small disfigured trees and/ or overshadowing conifers. The historic forest condition was open canopy dominated by large white oak with a grass/brush understory. The current condition is a white oak forest (possibly with Douglas fir present) of 400-800 TPA ranging from 2" - 16+" dbh and a few, very large, trees. Lack of fire has allowed the stand to increase to excessive numbers. This condition is causing a lack of structure, herbaceous layer, and diversity that is needed to meet the landowner's objectives for reducing wildfire hazard, improved wildlife habitat and forest health.

**After Situation:**

Retained stand of larger oaks (or threatened hardwoods) spaced at 40-120 per acre with an understory of grass/shrubs.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $10,619.16

**Scenario Cost/Unit:** $2,123.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 40 | $1,751.20 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 40 | $171.60 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 20 | $1,019.20 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 16 | $444.16 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 42 | $1,192.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 62 | $1,681.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 22 | $1,039.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 22 | $2,485.34 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** 670 - Lighting System Improvement

**Scenario** #1 - Lighting - CFL

**Scenario Description:**

To install dimmable CFLs to replace incandescent lamps on a one-for-one basis. Light fixtures do not have to be replaced. A typical poultry house has 48 fixtures. CFL requirements: minimum 8 Watt, 4100 Kelvin, dimmable, grow-out bulb; industrial grade; suitably protected from dirt accumulation. In high humidity environments or areas subject to wash down, gasketed or weatherproof housings are required to prevent corrosion and premature failure.

**Before Situation:**

An inefficient lighting system such as one using incandescent lamps has been identified by an on-farm energy audit.

**After Situation:**

More efficient lighting is provided by Compact Fluorescent Lamps (CFLs) in order to reduce energy use as evidenced by the energy audit. Associated practices/activities: 122-AgEMP - HQ and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each lamp replaced

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $20.48

**Scenario Cost/Unit:** $20.48

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 0.17 | $4.83 |
| **Materials** | | | | | | |
| Lighting, bulb, CFL, 8 watt | 1166 | 8 watt compact fluorescent lamp (CFL), typically 4100 Kelvin, dimmable, grow-out bulb, industrial grade, suitably protected from dirt accumulation. Materials only. | Each | $15.65 | 1 | $15.65 |

**Practice:** 670 - Lighting System Improvement

**Scenario** #2 - Lighting - LED

**Scenario Description:**

To install dimmable LEDs to replace incandescent lamps on a one-for-one basis. Light fixtures do not have to be replaced. A typical poultry house has 48 fixtures. LED requirements: minimum 6 Watt, 3700 Kelvin, dimmable, grow-out bulb; industrial grade; suitably protected from dirt accumulation. In high humidity environments or areas subject to wash down, gasketed or weatherproof housings are required to prevent corrosion and premature failure.

**Before Situation:**

An inefficient lighting system such as one using incandescent lamps has been identified by an on-farm energy audit.

**After Situation:**

More efficient lighting is provided by Light-Emitting Diode (LED) lamps in order to reduce energy use as evidenced by the energy audit. Associated practices/activities: 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each lamp replaced

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $15.67

**Scenario Cost/Unit:** $15.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 0.17 | $4.83 |
| **Materials** | | | | | | |
| Lighting, bulb, LED, 6 watt | 1167 | 6 watt light emitting diode (LED), typically 3700 Kelvin, dimmable, grow-out bulb; industrial grade; suitably protected from dirt accumulation. Materials only. | Each | $10.84 | 1 | $10.84 |

**Practice:** 670 - Lighting System Improvement

**Scenario** #3 - Lighting - Linear Fluorescent

**Scenario Description:**

The lighting system consists of a four-foot, three-lamp fixture with a single electronic ballast. The high-efficiency lighting system uses high-efficiency T8 or T5 fluorescent lamps. Associated materials for installation of replacement fixtures are included. Appropriate disposal of existing lamps, ballasts and other materials is required.

**Before Situation:**

Inefficient lighting (such as incandescent or T12 fluorescent tubes driven by magnetic ballasts) as evidenced by an on-farm energy audit.

**After Situation:**

High-efficiency lighting system which reduces energy use. The new lighting equipment will provide suitable light levels and reduce overall power requirements (kW) compared to the existing lighting system as evidenced by the energy audit. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each fixture replaced

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $371.13

**Scenario Cost/Unit:** $371.13

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 1 | $39.06 |
| **Materials** | | | | | | |
| Lighting, fixture, Fluorescent, 75 watt | 1168 | 75 watt fluorescent lamp fixture with T5 or T8 lamps and ballast. Materials only. | Each | $332.07 | 1 | $332.07 |

**Practice:** 670 - Lighting System Improvement

**Scenario** #4 - Lighting - Pulse-Start Metal Halide

**Scenario Description:**

The lighting system consists of a Pulse-Start Metal Halide (PSMH) lamp with a matched ballast or light-emitting diode (LED) equivalent fixtures (as detailed in ASABE S612-compliant energy audit). Associated materials for installation of replacement fixtures are included. Appropriate disposal of existing lamps, ballasts and other materials is required

**Before Situation:**

Inefficient high-bay or exterior lighting (such as mercury vapor, T12 fluorescent, or similar) as evidenced by an on-farm energy audit.

**After Situation:**

High-efficiency lighting system which reduces energy use. The new lighting equipment will provide suitable light levels and reduce overall power requirements (kW) compared to the existing lighting system as evidenced by the energy audit. Associated practices/activities: may include 122-AgEMP - HQ and activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each fixture replaced

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $40.07

**Scenario Cost/Unit:** $40.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 1 | $39.06 |
| **Materials** | | | | | | |
| Lighting, Pulse Start Metal Halide | 2425 | Replacement of lighting with PSMH Light. | Watt | $1.01 | 1 | $1.01 |

**Practice:** 670 - Lighting System Improvement

**Scenario** #5 - Automatic Controller System

**Scenario Description:**

The typical scenario consists of an automatic control system installed on an existing manually controlled agricultural lighting system. Typical components may include any of the following: wiring, sensors, data logger, logic controller, communication link, software, switches, and relay.

**Before Situation:**

A manually controlled Lighting system is existing in an agricultural facility that causes the inefficient use of energy, as evidenced by an on-farm energy audit.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of an automatic controller that helps regulates the energy consumption of the existing system. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm lighting operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each system

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $326.53

**Scenario Cost/Unit:** $326.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 4 | $156.24 |
| **Materials** | | | | | | |
| Switches and Controls, programmable controller | 1193 | Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $170.29 | 1 | $170.29 |

**Practice:** 670 - Lighting System Improvement

**Scenario** #12 - linear LED fixtures and installation

**Scenario Description:**

The lighting system consists of a four-foot, four-lamp fixture with a single electronic ballast. The high-efficiency lighting system uses high-efficiency LED lamps, which are included as part of the fixture. Associated materials for installation of replacement fixtures are included. Appropriate disposal of existing lamps, ballasts and other materials is required.

**Before Situation:**

Inefficient lighting (such as incandescent or T12 fluorescent tubes driven by magnetic ballasts) as evidenced by an on-farm energy audit.

**After Situation:**

High-efficiency lighting system which reduces energy use. The new lighting equipment will provide suitable light levels and reduce overall power requirements (kW) compared to the existing lighting system as evidenced by the energy audit. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each fixture replaced

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $371.53

**Scenario Cost/Unit:** $371.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 0.5 | $19.53 |
| **Materials** | | | | | | |
| Lighting, Fixture, LED, 66 watt | 2627 | Fixture with 4 linear LED lamps (4 foot tall) rated at 1600 lummens and 16.5 watts each. Includes materials and shipping only. | Each | $352.00 | 1 | $352.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #1 - Building Envelope - Attic Insulation

**Scenario Description:**

Install a minimum R-7 insulation in addition to existing attic or ceiling to reduce heat transfer. Increased insulation reduces seasonal heat loss and heat gain which reduces the respective need for heating and cooling equipment to operate.

**Before Situation:**

A poultry house with an inefficient building envelope with limited attic insulation.

**After Situation:**

A more effective and efficient building envelope can be created through addition of, or increased, attic insulation. Associated practices/activities: 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Area of Attic Insulated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 20,000.0

**Scenario Total Cost:** $19,000.00

**Scenario Cost/Unit:** $0.95

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Insulation, Fiberglass or cellulose, R-15 | 1196 | Fiberglass or cellulose insulation R-15, includes materials, equipment and labor to install. | Square Foot | $0.95 | 20000 | $19,000.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #2 - Building Envelope - Wall Insulation

**Scenario Description:**

Enclose both sidewalls and endwalls from ceiling to floor in one of two manners: 1) metal exterior, 3.5" fiberglass batts (R-11), vapor barrier, & interior plywood or OSB sheathing, or 2) closed-cell polyurethane foam application (minimum 1" thickness (R-7) of 2.5 lbs/cuft. or higher density, (3.0 or higher density preferred) with a form of physical protective barrier on lower 2' (may be 6 lbs/cuft. or higher density 1/8" thick foam, or treated lumber). Based on a 40' x 400' poultry house.

**Before Situation:**

A poultry house with an inefficient building envelope with limited wall insulation.

**After Situation:**

A more effective and efficient building envelope can be created through addition of, or increased, insulation. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Area of Attic Insulated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,500.0

**Scenario Total Cost:** $10,350.00

**Scenario Cost/Unit:** $2.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Insulation, Panel, R-11 with sheathing | 1197 | Insulated wall panel typically 3.5" fiberglass batts (R-11), vapor barrier and OSB sheathing, or equal, includes materials, equipment and labor to install. | Square Foot | $2.30 | 4500 | $10,350.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #3 - Building Envelope - Sealant

**Scenario Description:**

A typical scenario is sealing the gaps between walls, gables, ceiling, etc. in a poultry house or greenhouse. Sealing is performed by a professional contractor, not merely use of spray foam from a can. The unit basis of payment in this scenario is each house based on 60' x 500' poultry house with an assumed need of sealant to seal 2400 linear feet of gap.

**Before Situation:**

An agricultural facility with an inefficient building envelope with gaps between walls, ceiling, etc. for a total of 2400 linear feet.

**After Situation:**

A more effective and efficient building envelope can be created through interior sealing of the exterior walls at the footer plate, eaves, ridge cap, and gable ends. The sealant reduces seasonal heat loss and heat gain due to infiltration which reduces the respective need for heating and cooling equipment to operate. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Perimeter of heated structure

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,400.0

**Scenario Total Cost:** $4,800.00

**Scenario Cost/Unit:** $2.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Sealant | 1150 | Greenhouse and building gap sealant. Performed by a professional contractor spraying the areas with an approved sealant for poultry production facilities. Includes materials, equipment and labor to install. | Foot | $2.00 | 2400 | $4,800.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #4 - Building Envelope - Greenhouse Screens

**Scenario Description:**

The mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven strips of aluminum fiber, polyethylene, nylon or other synthetic material. The screen provides a means to better control solar heat gain and heat transfer during night or cold weather conditions to reduce energy use. Screens and similar devices may also be used to divide internal areas and allow for differentiated heating, ventilation, or cooling system operation to reduce energy use.

**Before Situation:**

Heating and cooling of an existing greenhouse, or similar structure with conditioned spaces, is inefficient due to poorly regulated heat transfer. A need to regulate an entire space for uniform conditions when some portions have differing, intermittent requirements can also reduce efficiency.

**After Situation:**

The greenhouse is fitted with a mechanically controlled energy screen installed truss-to-truss or gutter-to-gutter, with side screens as necessary, reducing heat loss in the greenhouse. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Area of Screen

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 25,000.0

**Scenario Total Cost:** $52,874.96

**Scenario Cost/Unit:** $2.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| **Materials** | | | | | | |
| Thermal blanket 10,001 - 50,000 square foot | 1148 | Thermal blanket greenhouse screens: mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven. Size Range is 10,001 to 50,000 square feet. Materials only. | Square Foot | $2.09 | 25000 | $52,250.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #5 - Greenhouse - Insulate Unglazed Walls

**Scenario Description:**

A typical scenario is the installation insulation in green house to address energy loss. The insulation can be either of the cellulose or bubble type (or equivalent). The increased insulation reduces seasonal heat loss and heat gain which reduces the respective need for heating and cooling equipment to operate.

**Before Situation:**

Green house with standard glazing, plastic or polycarbonate walls and no insulation. Heating and cooling of an existing greenhouse is inefficient due to excessive heat loss.

**After Situation:**

The greenhouse is fitted with insulation installed truss-to-truss or gutter-to-gutter and/or non glazed endwalls and/or sidewalls, reducing heat loss and gain in the greenhouse. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Square Feet of insulation

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 25,000.0

**Scenario Total Cost:** $8,124.96

**Scenario Cost/Unit:** $0.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| **Materials** | | | | | | |
| Insulation, Greenhouse, Reflective Bubble | 2410 | Double bubble reflective insulation with aluminum foil on both sides. Includes materials and shipping only. | Square Foot | $0.30 | 25000 | $7,500.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #6 - Insulated Door

**Scenario Description:**

A typical scenario is installing an insulated roll-up or swinging door and any required hanging or installation hardware in a building or animal house to reduce energy loss. Roll-up doors, no less than 20 gauge, can be chain operated or mechanical. Installing an insulated door reduces seasonal heat loss and heat gain which reduces the need for heating and cooling.

**Before Situation:**

A Building or animal house with non-insulated doors and/or damaged doors. Heating and cooling of structure is inefficient due to excessive heat loss.

**After Situation:**

The building or animal house is fitted with a roll-up or swinging insulated door, reducing heat loss and gain in the building. Associated practices/activities: may include 122-AgEMP - HQ , 374-Farmstead Energy Improvement and the 670 Building Envelope sealant scenario . The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Size of Door

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 168.0

**Scenario Total Cost:** $1,732.48

**Scenario Cost/Unit:** $10.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| **Materials** | | | | | | |
| Door, Insulated, Roll-up | 2392 | Rolling service insulated steel door, 20 gauge. Includes hardware required to install. Used to replace non insulated door in buildings. Materials only. | Square Foot | $8.96 | 168 | $1,505.28 |

**Practice:** 775 - Drainage Ditch Covering

**Scenario** #1 - Crib Cover Only

**Scenario Description:**

This scenario is the construction of a treated plywood cover for a drainage ditch. The structural framing (cribbing) for the cover exists. Typical construction dimension width is 16 inches. Resource concerns: Water Quality Degradation. Associated Conservation Practices: 608-Surface Drain, Main or Lateral; 587 -Structure For Water Control; 554 - Drainage Water Management

**Before Situation:**

Agrichemicals are directly applied to water in drainage ditches.

**After Situation:**

Direct application of agrichemicals to water in ditches is blocked.

**Feature Measure:** Linear Feet of Ditch

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $2,061.34

**Scenario Cost/Unit:** $6.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| **Materials** | | | | | | |
| Plywood, 3/4 inch, treated | 2363 | Treated 4' x 8' sheets of 3/4 inch exterior grade plywood | Each | $38.38 | 13 | $498.94 |

**Practice:** 775 - Drainage Ditch Covering

**Scenario** #3 - Cribbing One Side and Cover

**Scenario Description:**

"This scenario is the construction of cribbing (structural framing), to support a treated plywood cover (also installed), on both sides of the drainage ditch. Typical construction dimension height is 18 inches on the berm side and 12 inches on the field (bog) side. A cover measuring 16 inches in width is attached to the cribbing. Resource concerns: Water Quality Degradation. Associated Conservation Practices: 608-Surface Drain, Main or Lateral; 587 -Structure For Water Control; 554 - Drainage Water Management"

**Before Situation:**

Agrichemicals are directly applied to water in drainage ditches.

**After Situation:**

Direct application of agrichemicals to water in ditches is blocked.

**Feature Measure:** Linear Feet of Ditch

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $5,222.62

**Scenario Cost/Unit:** $17.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 88 | $3,437.28 |
| **Materials** | | | | | | |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 1340 | $1,286.40 |
| Plywood, 3/4 inch, treated | 2363 | Treated 4' x 8' sheets of 3/4 inch exterior grade plywood | Each | $38.38 | 13 | $498.94 |

**Practice:** 775 - Drainage Ditch Covering

**Scenario** #60 - Cribbing Two Sides and Cover

**Scenario Description:**

"This scenario is the construction of cribbing (structural framing), to support a treated plywood cover (also installed), on both sides of the drainage ditch. Typical construction dimension height is 18 inches on the berm side and 12 inches on the field (bog) side. A cover measuring 16 inches in width is attached to the cribbing. Resource concerns: Water Quality Degradation. Associated Conservation Practices: 608-Surface Drain, Main or Lateral; 587 -Structure For Water Control; 554 - Drainage Water Management"

**Before Situation:**

Agrichemicals are directly applied to water in drainage ditches.

**After Situation:**

Direct application of agrichemicals to water in ditches is blocked.

**Feature Measure:** Linear Feet of Ditch

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $7,607.26

**Scenario Cost/Unit:** $25.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 136 | $5,312.16 |
| **Materials** | | | | | | |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.96 | 1871 | $1,796.16 |
| Plywood, 3/4 inch, treated | 2363 | Treated 4' x 8' sheets of 3/4 inch exterior grade plywood | Each | $38.38 | 13 | $498.94 |

**Practice:** B000BFF1 - Buffer Bundle#1

**Scenario** #1 - Buffer Bundle#1

**Scenario Description:**
Addresses water quality degradation, degraded plant condition, fish/wildlife inadequate habitat, and/or air quality impacts.

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $2,715.32

**Scenario Cost/Unit:** $905.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 10 | $123.60 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 1 | $26.78 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 341 | $190.96 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 340 | $282.20 |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| Untreated Conventional Seed, Pollinator Mix, Native Perennial Grasses and Forbs | 2346 | Untreated conventional native perennial grass and legume pollinator mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $252.12 | 1 | $252.12 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** B000BFF2 - Buffer Bundle#2

**Scenario** #1 - Buffer Bundle#2

**Scenario Description:**
Addresses water quality degradation, degraded plant condition, fish/wildlife inadequate habitat, and/or air quality impacts.

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $2,715.32

**Scenario Cost/Unit:** $905.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 10 | $123.60 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 1 | $26.78 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 341 | $190.96 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 340 | $282.20 |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| Untreated Conventional Seed, Pollinator Mix, Native Perennial Grasses and Forbs | 2346 | Untreated conventional native perennial grass and legume pollinator mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $252.12 | 1 | $252.12 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** B000CPL1 - Crop Bundle#1 - Precision Ag, No till

**Scenario** #1 - Crop Bundle#1 - Precision Ag, No till

**Scenario Description:**
?Addresses water quality degradation, air quality, and fish/wildlife inadequate habitat plus an option on soil erosion or soil quality degradation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,735.75

**Scenario Cost/Unit:** $37.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, precision application | 949 | Chemical application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $9.67 | 100 | $967.00 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.47 | 100 | $1,047.00 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.51 | $201.02 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.45 | $154.42 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.29 | $57.95 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 35 | $357.35 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** B000CPL2 - Crop Bundle#2 - Precision Ag, Reduced till

**Scenario** #1 - Crop Bundle#2 - Precision Ag, RT

**Scenario Description:**
?Addresses water quality degradation, air quality, and fish/wildlife inadequate habitat plus an option on soil erosion or soil quality degradation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,735.75

**Scenario Cost/Unit:** $37.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, precision application | 949 | Chemical application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $9.67 | 100 | $967.00 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.47 | 100 | $1,047.00 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.51 | $201.02 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.45 | $154.42 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.29 | $57.95 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 35 | $357.35 |

**Practice:** B000CPL3 - Crop Bundle#3 - Soil health rotation, No till

**Scenario** #1 - Crop Bundle#3 - Soil health rotation, NT

**Scenario Description:**
Addresses soil quality degradation, insufficient water, water quality degradation, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,170.20

**Scenario Cost/Unit:** $41.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, precision application | 949 | Chemical application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $9.67 | 100 | $967.00 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.47 | 100 | $1,047.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 13 | $1,468.61 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 35 | $357.35 |
| Untreated Conventional Seed, Pollinator Mix, Native Perennial Grasses and Forbs | 2346 | Untreated conventional native perennial grass and legume pollinator mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $252.12 | 1 | $252.12 |

**Practice:** B000CPL4 - Crop Bundle#4 - Soil health rotation, Reduced till

**Scenario** #1 - Crop Bundle#4 - SH rotation, RT

**Scenario Description:**
?Addresses soil quality degradation, insufficient water, water quality degradation, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,170.20

**Scenario Cost/Unit:** $41.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, precision application | 949 | Chemical application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $9.67 | 100 | $967.00 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.47 | 100 | $1,047.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 13 | $1,468.61 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 35 | $357.35 |
| Untreated Conventional Seed, Pollinator Mix, Native Perennial Grasses and Forbs | 2346 | Untreated conventional native perennial grass and legume pollinator mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $252.12 | 1 | $252.12 |

**Practice:** B000CPL5 - Crop Bundle#5 - Soil Health Assessment, No till

**Scenario** #1 - Crop Bundle#5 - SH Assessment, NT

**Scenario Description:**
?Addresses soil quality degradation, insufficient water, water quality degradation, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,662.26

**Scenario Cost/Unit:** $46.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, precision application | 949 | Chemical application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $9.67 | 100 | $967.00 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.47 | 100 | $1,047.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 16 | $1,807.52 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 15 | $153.15 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 35 | $357.35 |
| Untreated Conventional Seed, Pollinator Mix, Native Perennial Grasses and Forbs | 2346 | Untreated conventional native perennial grass and legume pollinator mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $252.12 | 1 | $252.12 |

**Practice:** B000CPL6 - Crop Bundle#6 - Soil Health Assessment, Reduced till

**Scenario** #1 - Crop Bundle#6 - SH Assessment, RT

**Scenario Description:**
?Addresses soil quality degradation, insufficient water, water quality degradation, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,662.26

**Scenario Cost/Unit:** $46.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, precision application | 949 | Chemical application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $9.67 | 100 | $967.00 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.47 | 100 | $1,047.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 16 | $1,807.52 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 15 | $153.15 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 35 | $357.35 |
| Untreated Conventional Seed, Pollinator Mix, Native Perennial Grasses and Forbs | 2346 | Untreated conventional native perennial grass and legume pollinator mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $252.12 | 1 | $252.12 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** B000CPL7 - Crop Bundle#7 - Soil Health -"Organic"

**Scenario** #1 - Crop Bundle#7 - Soil Health -"Organic"

**Scenario Description:**
Addresses soil quality degradation, water quality degradation, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,449.77

**Scenario Cost/Unit:** $44.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 10 | $123.60 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $8.19 | 100 | $819.00 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.86 | 5 | $64.30 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 1 | $26.78 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 341 | $190.96 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 340 | $282.20 |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** B000CPL8 - Crop Bundle#8 - "Organic", Water erosion

**Scenario** #1 - Crop Bundle#8 - "Organic", Water erosion

**Scenario Description:**
Addresses soil erosion, soil quality degradation, and water quality degradation plus an option on fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,415.49

**Scenario Cost/Unit:** $34.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 1 | $39.06 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 14 | $1,581.58 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $8.19 | 100 | $819.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 15 | $153.15 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.86 | 5 | $64.30 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 20 | $758.40 |

**Practice:** B000CPL9 - Crop Bundle#9 - "Organic", Wind erosion

**Scenario** #1 - Crop Bundle#9 - "Organic", Wind erosion

**Scenario Description:**
Addresses soil erosion, soil quality degradation, and water quality degradation plus an option on fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,415.49

**Scenario Cost/Unit:** $34.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 1 | $39.06 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 14 | $1,581.58 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $8.19 | 100 | $819.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 15 | $153.15 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.86 | 5 | $64.30 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 20 | $758.40 |

**Practice:** B000FST1 - Forest Bundle#1

**Scenario** #1 - Forest Bundle#1

**Scenario Description:**
Addresses forest management on sites that are not adapted to natural fire disturbances. Addresses resource concerns air quality impacts, degraded plant condition and fish/wildlife inadequate habitat.

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 111.0

**Scenario Total Cost:** $9,159.07

**Scenario Cost/Unit:** $82.51

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 45 | $193.05 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 15 | $320.85 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 41 | $2,612.11 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 11 | $135.96 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 7 | $273.42 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 49 | $1,391.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 17 | $1,264.97 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 20 | $141.40 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.98 | 21 | $398.58 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 1 | $26.78 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 605 | $338.80 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 218 | $180.94 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** B000PST1 - Pasture Bundle#1 - Organic

**Scenario** #1 - Pasture Bundle#1 - Organic

**Scenario Description:**
Addresses water quality degradation, degraded plant condition, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 111.0

**Scenario Total Cost:** $9,846.20

**Scenario Cost/Unit:** $88.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 5 | $35.90 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 5 | $106.95 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 5 | $121.60 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 30 | $386.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 33 | $937.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 5 | $135.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 1 | $112.97 |
| **Materials** | | | | | | |
| Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll | 1 | Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only. | Each | $72.51 | 4 | $290.04 |
| Post, Wood, CCA treated, 3-4" x 7' | 9 | Wood Post, Line 3-4" X 7', CCA Treated. Includes materials and shipping only. | Each | $6.38 | 20 | $127.60 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.38 | 8 | $123.04 |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.81 | 90 | $612.90 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 1320 | $224.40 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 1 | $10.21 |
| Gate, Pipe, 12' | 1057 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $169.37 | 2 | $338.74 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $566.31 | 10 | $5,663.10 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** B000PST2 - Pasture Bundle#2

**Scenario** #1 - Pasture Bundle#2

**Scenario Description:**
Addresses soil quality degradation, water quality degradation, and degraded plant condition plus an option on fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 210.0

**Scenario Total Cost:** $3,531.52

**Scenario Cost/Unit:** $16.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 2 | $127.42 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 6 | $166.56 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 0 | $0.00 |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 10 | $128.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 1 | $48.49 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.48 | 2000 | $960.00 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 3 | $30.63 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 20 | $958.00 |

**Practice:** B000PST3 - Pasture Bundle#3 -- Soil Health

**Scenario** #1 - Pasture Bundle#3 -- Soil Health

**Scenario Description:**
Addresses soil quality degradation, water quality degradation, and degraded plant condition

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,067.42

**Scenario Cost/Unit:** $30.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 0 | $0.00 |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 25 | $322.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 32 | $1,249.92 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 20 | $958.00 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** B000PST4 - Pasture Bundle#4 - Monarch butterfly

**Scenario** #1 - Pasture Bundle#4 - Monarch butterfly

**Scenario Description:**
Addresses soil erosion, soil quality degradation, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $9,255.08

**Scenario Cost/Unit:** $46.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 0 | $0.00 |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 25 | $322.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 1 | $48.49 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 10 | $2,132.20 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $566.31 | 10 | $5,663.10 |

**Practice:** B000RNG1 - Range Bundle#1 - Organic

**Scenario** #1 - Range Bundle#1 - Organic

**Scenario Description:**
Addresses degraded plant condition, fish/wildlife inadequate habitat and livestock production limitation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $964.45

**Scenario Cost/Unit:** $0.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $121.75 | 4 | $487.00 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 1 | $27.76 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 4 | $160.64 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Vinyl Undersill Strips | 241 | Marking material using the "undersill" strips of vinyl siding. Priced per foot of fence per each wire. Materials only. | Foot | $0.06 | 2000 | $120.00 |

**Practice:** B000RNG2 - Range Bundle#2

**Scenario** #1 - Range Bundle#2

**Scenario Description:**
Addresses soil erosion, degraded plant condition, fish/wildlife inadequate habitat and livestock production limitation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,100.0

**Scenario Total Cost:** $4,533.34

**Scenario Cost/Unit:** $4.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 1 | $27.76 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 12 | $333.12 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 12 | $154.56 |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 54 | $695.52 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 32 | $1,249.92 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 17 | $482.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 4 | $193.96 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Vinyl Undersill Strips | 241 | Marking material using the "undersill" strips of vinyl siding. Priced per foot of fence per each wire. Materials only. | Foot | $0.06 | 2000 | $120.00 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |

**Practice:** B000RNG3 - Range Bundle#3 - Soil Health

**Scenario** #1 - Range Bundle#3 - Soil Health

**Scenario Description:**
Addresses soil quality degradation, degraded plant condition, and livestock production limitation plus an option on fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,115.72

**Scenario Cost/Unit:** $2.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |

**Practice:** B000WLW - Working Lands for Wildlife Bundle

**Scenario** #1 - Working Lands for Wildlife Bundle

**Scenario Description:**
Addresses degraded plant condition, fish/wildlife inadequate habitat, and livestock production limitation plus an option on soil quality degradation and water quality degradation.

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,320.21

**Scenario Cost/Unit:** $2.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 1 | $27.76 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 15 | $193.20 |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 150 | $1,932.00 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Vinyl Undersill Strips | 241 | Marking material using the "undersill" strips of vinyl siding. Priced per foot of fence per each wire. Materials only. | Foot | $0.06 | 2000 | $120.00 |

**Practice:** E314133Z - Brush management for improved structure and composition

**Scenario** #1 - Brush mgmt., improved structure and comp

**Scenario Description:**

Brush management is employed to create a desired plant community, consistent with the related ecological site steady state, which will maintain or enhance the wildlife habitat desired for the identified wildlife species. It will be designed to provide plant structure, density and diversity needed to meet those habitat objectives. This enhancement does not apply to removal of woody vegetation by prescribed fire or removal of woody vegetation to facilitate a land use change.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 314 - Brush Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 314 - Brush Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,847.48

**Scenario Cost/Unit:** $18.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 12 | $154.56 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 32 | $1,249.92 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |

**Practice:** E314134Z - Brush management that maintains or enhances wildlife or fish habitat

**Scenario** #1 - Brush mgmt., enhance habitat

**Scenario Description:**

Brush management is employed to create a desired plant community, consistent with the related ecological site steady state, which will maintain or enhance the wildlife habitat desired for the identified wildlife species. It will be designed to provide plant structure, density and diversity needed to meet those habitat objectives. This enhancement does not apply to removal of woody vegetation by prescribed fire or removal of woody vegetation to facilitate a land use change.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 314 - Brush Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 314 - Brush Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,847.48

**Scenario Cost/Unit:** $18.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 12 | $154.56 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 32 | $1,249.92 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |

**Practice:** E315132Z - Herbaceous weed control for desired plant communities/habitats consistent with the ecological site

**Scenario** #1 - Herbaceous weed control-habitats

**Scenario Description:**

Mechanical, chemical, or biological, herbaceous weed control will be employed to control targeted, herbaceous weeds so as to create, release, or restore desired plant communities that are consistent with achievable, ecological site, steady state descriptions.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $127.42

**Scenario Cost/Unit:** $12.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 2 | $127.42 |

**Practice:** E315133Z - Herbaceous weed control (inadequate structure and comp) for desired plant communities/habitats

**Scenario** #1 - Herbaceous weed control-communities

**Scenario Description:**

Mechanical, chemical, or biological, herbaceous weed control will be employed to control targeted, herbaceous weeds so as to create, release, or restore desired plant communities that are consistent with achievable, ecological site, steady state descriptions.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $127.42

**Scenario Cost/Unit:** $12.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 2 | $127.42 |

**Practice:** E315134Z - Herbaceous weed control (plant pest pressures) for desired plant communities/habitats

**Scenario** #1 - Herbaceous weed control-pest pressures

**Scenario Description:**

Mechanical, chemical, or biological, herbaceous weed control will be employed to control targeted, herbaceous weeds so as to create, release, or restore desired plant communities that are consistent with achievable, ecological site, steady state descriptions.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $127.42

**Scenario Cost/Unit:** $12.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 2 | $127.42 |

**Practice:** E327136Z1 - Conservation cover to provide food habitat for pollinators and beneficial insects

**Scenario** #1 - Conservation cover-pollinator food

**Scenario Description:**

Seed or plug nectar and pollen producing plants in non-cropped areas such as field borders, vegetative barriers, contour buffer strips, grassed waterways, shelterbelts, hedgerows, windbreaks, conservation cover, and riparian forest and herbaceous buffers.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 327 - Conservation Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 327 - Conservation Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $330.24

**Scenario Cost/Unit:** $330.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| **Materials** | | | | | | |
| Untreated Conventional Seed, Pollinator Mix, Native Perennial Grasses and Forbs | 2346 | Untreated conventional native perennial grass and legume pollinator mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $252.12 | 1 | $252.12 |

**Practice:** E327136Z2 - Establish Monarch butterfly habitat

**Scenario** #1 - Establish monarch butterfly habitat

**Scenario Description:**

Seed or plug milkweed (Asclepias spp.), the Monarch butterfly larval hostplant, and high-value monarch butterfly nectar plants in non-cropped areas such as field borders, contour buffer strips, and associated grasslands.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 327 - Conservation Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 327 - Conservation Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,374.76

**Scenario Cost/Unit:** $2,374.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 1 | $50.96 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 2 | $127.42 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 1 | $112.97 |
| **Materials** | | | | | | |
| Highly Specialized native grass and forb mix | 2618 | A mix of native grass and forbs to be used for restoration of Monarch butterfly foraging and larva development habitat. Includes material and shipping only. | Acre | $1,981.35 | 1 | $1,981.35 |

**Practice:** E327137Z - Conservation cover to provide cover and shelter habitat for pollinators and beneficial insects

**Scenario** #1 - Conservation cover-pollinator shelter

**Scenario Description:**

Seed or plug nectar and pollen producing plants in non-cropped areas such as field borders, vegetative barriers, contour buffer strips, grassed waterways, shelterbelts, hedgerows, windbreaks, conservation cover, and riparian forest and herbaceous buffers.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 327 - Conservation Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 327 - Conservation Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $330.24

**Scenario Cost/Unit:** $330.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| **Materials** | | | | | | |
| Untreated Conventional Seed, Pollinator Mix, Native Perennial Grasses and Forbs | 2346 | Untreated conventional native perennial grass and legume pollinator mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $252.12 | 1 | $252.12 |

**Practice:** E327139Z - Conservation cover to provide habitat continuity for pollinators and beneficial insects

**Scenario** #1 - Conservation cover-habitat continuity

**Scenario Description:**

Seed or plug nectar and pollen producing plants in non-cropped areas such as field borders, vegetative barriers, contour buffer strips, grassed waterways, shelterbelts, hedgerows, windbreaks, conservation cover, and riparian forest and herbaceous buffers.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 327 - Conservation Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 327 - Conservation Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $330.24

**Scenario Cost/Unit:** $330.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| **Materials** | | | | | | |
| Untreated Conventional Seed, Pollinator Mix, Native Perennial Grasses and Forbs | 2346 | Untreated conventional native perennial grass and legume pollinator mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $252.12 | 1 | $252.12 |

**Practice:** E328101I - Improved resource conserving crop rotation to reduce water erosion

**Scenario** #1 - IRCCR water erosion

**Scenario Description:**

Improve an existing Resource Conserving Crop Rotation. Must enrich and existing rotation which already includes AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plant pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $564.85

**Scenario Cost/Unit:** $5.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E328101R - Resource conserving crop rotation to reduce water erosion

**Scenario** #1 - RCCR water erosion

**Scenario Description:**

Establish a Resource Conserving Crop Rotation. Rotation must include AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,581.58

**Scenario Cost/Unit:** $15.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 14 | $1,581.58 |

**Practice:** E328101Z - Conservation crop rotation on recently converted CRP grass/legume cover for water erosion

**Scenario** #1 - CRP trans crop rotation-water erosion

**Scenario Description:**

Implement a crop rotation management system on crop land acres that have recently converted from CRP grass/legume conservation cover to annual planted crops. Crop rotation minimizes disturbance resulting in a Soil Tillage Intensity Rating (STIR) less than10 and reduces soil erosion from water to below soil tolerance (T) level. RUSLE2 must be used to document the rotation, soil erosion estimate, and STIR calculations. *This enhancement is limited to acres where the conversion event took place not more than 2 years prior. Enhancement not applicable on hayland.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E328102I - Improved resource conserving crop rotation to reduce wind erosion

**Scenario** #1 - IRCCR wind erosion

**Scenario Description:**

Improve an existing Resource Conserving Crop Rotation. Must enrich and existing rotation which already includes AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plant pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $564.85

**Scenario Cost/Unit:** $5.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E328102R - Resource conserving crop rotation to reduce wind erosion

**Scenario** #1 - RCCR wind erosion

**Scenario Description:**

Establish a Resource Conserving Crop Rotation. Rotation must include AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,581.58

**Scenario Cost/Unit:** $15.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 14 | $1,581.58 |

**Practice:** E328102Z - Conservation crop rotation on recently converted CRP grass/legume cover for wind erosion

**Scenario** #1 - CRP trans crop rotation-wind erosion

**Scenario Description:**

Implement a crop rotation management system on crop land acres that have recently converted from CRP grass/legume conservation cover to annual planted crops. Crop rotation minimizes disturbance resulting in a Soil Tillage Intensity Rating (STIR) less than10 and reduces soil erosion from wind to below soil tolerance (T) level. WEPS must be used to document the rotation, soil erosion estimate, and STIR calculations. *This enhancement is limited to acres where the conversion event took place not more than 2 years prior. Enhancement not applicable on hayland.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E328106I - Improved resource conserving crop rotation for soil organic matter improvement

**Scenario** #1 - IRCCR for SOM improvement

**Scenario Description:**

Improve an existing Resource Conserving Crop Rotation. Must enrich and existing rotation which already includes AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plant pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $564.85

**Scenario Cost/Unit:** $5.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E328106R - Resource conserving crop rotation for soil organic matter improvement

**Scenario** #1 - RCCR for SOM improvement

**Scenario Description:**

Establish a Resource Conserving Crop Rotation. Rotation must include AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plant pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,581.58

**Scenario Cost/Unit:** $15.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 14 | $1,581.58 |

**Practice:** E328106Z1 - Soil health crop rotation

**Scenario** #1 - Soil health crop rotation

**Scenario Description:**

Implement a crop rotation which addresses all four principle components of soil health: increases diversity of the cropping system; maintains residue throughout the year; keeps a living root; and minimizes soil chemical, physical and biological disturbance. The rotation will include at least 4 different crop and/or cover crop types (crop types include cool season grass, warm season grass, cool season broadleaf, warm season broadleaf) grown in a sequence that will produce a positive trend in the Organic Matter (OM) subfactor value over the life of the rotation, as determined by the Soil Conditioning Index (SCI). RUSLE2 or WEPS must be used to document the rotation and SCI calculations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $564.85

**Scenario Cost/Unit:** $5.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E328106Z2 - Modifications to improve soil health and increase soil organic matter

**Scenario** #1 - Mod to improve SH and SOM

**Scenario Description:**

Use of soil health assessment to evaluate impact of current conservation crop rotation in addressing soil organic matter depletion (primary assessment made in Year 1). Modifications to the crop rotation and/or crop management will be made as a result of the assessment results (adding a new crop and/or cover crop to the rotation; making changes to planting and/or tillage system, harvest timing of crops, or termination timing of cover crops). During Year 3 a follow up assessment will be completed to allow time for the modifications to show increased soil organic matter. Modified system must produce a positive trend in the Organic Matter (OM) subfactor value over the life of the rotation, as determined by the Soil Conditioning Index (SCI). RUSLE2 or WEPS must be used to document the rotation and SCI calculations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,056.91

**Scenario Cost/Unit:** $10.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 15 | $153.15 |

**Practice:** E328106Z3 - Conservation crop rotation on recently converted CRP grass/legume cover for SOM improvement

**Scenario** #1 - CRP trans crop rotation-SOM

**Scenario Description:**

Implement a crop rotation management system on crop land acres that have recently converted from CRP grass/legume conservation cover to annual planted crops. The crop rotation adds diversity to the system; keeps a living root growing; and is managed to minimize soil chemical, physical and biological disturbance and maintain residue cover on the surface. The rotation includes crops and/or cover crops representing 3 of the 4 crop types during the planned crop sequence: warm season grass (WSG), warm season broadleaf (WSB), cool season grass (CSG), or cool season broadleaf (CSB). The crop rotation will produce a positive trend in the Organic Matter (OM) subfactor value over the life of the rotation, as determined by the SCI. Crop rotation minimizes disturbance resulting in a Soil Tillage Intensity Rating (STIR) less than10 and reduces soil erosion from wind to below soil tolerance (T) level. RUSLE2 or WEPS must be used to document the rotation, STIR and SCI calculations. *This enhancement is limited to acres where the conversion event took place not more than 2 years prior. Enhancement not applicable on hayland.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $564.85

**Scenario Cost/Unit:** $5.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E328107I - Improved resource conserving crop rotation to improve soil compaction

**Scenario** #1 - IRCCR to improve soil compaction

**Scenario Description:**

Improve an existing Resource Conserving Crop Rotation. Must enrich and existing rotation which already includes AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plant pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $564.85

**Scenario Cost/Unit:** $5.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E328107R - Resource conserving crop rotation to improve soil compaction

**Scenario** #1 - RCCR to improve soil compaction

**Scenario Description:**

Establish a Resource Conserving Crop Rotation. Rotation must include AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,581.58

**Scenario Cost/Unit:** $15.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 14 | $1,581.58 |

**Practice:** E328109Z - Conservation crop rotation to reduce the concentration of salts

**Scenario** #1 - Rotate to reduce salt concentration

**Scenario Description:**

Implement a crop rotation to reduce the concentration of salts and other chemicals from saline seeps. The rotation should include at least 3 crops and/or cover crops grown in a sequence in the recharge areas of saline seeps that have rooting depths and water requirements adequate to fully utilize all available soil water. Do not use summer fallow. Use an approved water balance procedure to determine crop selection and sequence. Select crops with a tolerance to salinity levels that match the salinity of the discharge area. <see state lists>

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $451.88

**Scenario Cost/Unit:** $4.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |

**Practice:** E328134I - Improved resource conserving crop rotation to relieve plant pest pressure

**Scenario** #1 - IRCCR to relieve plant pest pressure

**Scenario Description:**

Improve an existing Resource Conserving Crop Rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $564.85

**Scenario Cost/Unit:** $5.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E328134R - Resource conserving crop rotation to relieve plant pest pressure

**Scenario** #1 - RCCR to relieve plant pest pressure

**Scenario Description:**

Establish a Resource Conserving Crop Rotation. Rotation must include AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,581.58

**Scenario Cost/Unit:** $15.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 14 | $1,581.58 |

**Practice:** E328136Z - Leave standing grain crops unharvested to benefit wildlife food sources

**Scenario** #1 - Leave standing grain crops for food

**Scenario Description:**
Implement a crop rotation which allows a portion of grain crops to be left in fields un-harvested to provide food and cover for wildlife during winter months.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $206.56

**Scenario Cost/Unit:** $5.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.17 | $67.01 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.17 | $58.34 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.17 | $33.97 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |

**Practice:** E328137Z - Leave standing grain crops unharvested to benefit wildlife cover and shelter

**Scenario** #1 - Leave standing grain crops for shelter

**Scenario Description:**
Implement a crop rotation which allows a portion of grain crops to be left in fields un-harvested to provide food and cover for wildlife during winter months.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $206.56

**Scenario Cost/Unit:** $5.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.17 | $67.01 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.17 | $58.34 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.17 | $33.97 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |

**Practice:** E329101Z - No till to reduce water erosion

**Scenario** #1 - No till to reduce water erosion

**Scenario Description:**

Establish no till system to reduce sheet and rill erosion soil loss. Field(s) must have a soil loss at or below the soil tolerance (T) level for water erosion for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 10 for each crop in the planned rotation. RUSLE2 must be used to calculate soil loss and STIR.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E329102Z - No till system to reduce wind erosion

**Scenario** #1 - No till system to reduce wind erosion

**Scenario Description:**

Establish no till system to reduce wind erosion soil loss. Field(s) must have a soil loss at or below the soil tolerance (T) level for wind erosion for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 10 for each crop in the planned rotation. WEPS must be used to calculate soil loss and STIR.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E329106Z - No till system to increase soil health and soil organic matter content

**Scenario** #1 - No till system to increase SH and SOM

**Scenario Description:**

Establish a reduced till system to increase soil health and soil organic matter content. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 20. The crop rotation must achieve a soil conditioning index (SCI) of zero or higher and produce a positive trend in the Organic Matter (OM) subfactor over the life of the crop rotation. RUSLE2 or WEPS must be used to document STIR and SCI calculations. Residue shall not be burned, grazed, or harvested.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $451.88

**Scenario Cost/Unit:** $4.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |

**Practice:** E329114Z - No till to increase plant-available moisture: irrigation water

**Scenario** #1 - No till for IWM

**Scenario Description:**

Establish a no till system to increase plant-available moisture. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 20. RUSLE2 or WEPS must be used to document STIR calculations. Maintain a minimum 60 percent surface residue cover throughout the year to reduce evaporation from the soil surface.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E329115Z - No till to increase plant-available moisture: moisture management

**Scenario** #1 - No till for moisture mgmt.

**Scenario Description:**

Establish a no till system to increase plant-available moisture. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 20. RUSLE2 or WEPS must be used to document STIR calculations. Maintain a minimum 60 percent surface residue cover throughout the year to reduce evaporation from the soil surface.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E329128Z - No till to reduce tillage induced particulate matter

**Scenario** #1 - No till to reduce PM

**Scenario Description:**

Establish no till system to reduce tillage induced particulate matter. Field(s) must have a soil loss at or below the soil tolerance (T) level for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 10 for each crop in the planned rotation. RUSLE2 or WEPS must be used to document soil loss and STIR calculations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E329144Z - No till to reduce energy

**Scenario** #1 - No till to reduce energy

**Scenario Description:**

Establish a no till system which reduces total energy consumption associated with field operations by at least 25% compared to current tillage system (benchmark). Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 20. The current NRCS wind and water erosion prediction technologies must be used to document STIR calculations and energy consumption.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $451.88

**Scenario Cost/Unit:** $4.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |

**Practice:** E334107Z - Controlled traffic farming to reduce compaction

**Scenario** #1 - Controlled traffic for compaction

**Scenario Description:**

Establish a controlled traffic system where no more than 25% of the surface is tracked with heavy axel loads to minimize soil compaction. For row crops (e.g. corn in 30-inch rows) no tire should run on a row except for flotation tires on combines and/or fertilizer and lime spreading trucks. If wide flotation tires are used, they must be big enough that the inflation pressure will be below 18 psi to minimize compaction on trafficked rows.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 334 - Controlled Traffic Farming

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 334 - Controlled Traffic Farming

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $848.85

**Scenario Cost/Unit:** $8.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E340101Z - Cover crop to reduce water erosion

**Scenario** #1 - Cover crop to reduce water erosion

**Scenario Description:**

Cover crop added to current crop rotation to reduce soil erosion from water to below soil tolerance (T) level. Cover crops grown during critical erosion period(s). Species are selected that will have physical characteristics to provide adequate erosion protection.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $797.46

**Scenario Cost/Unit:** $7.97

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 1 | $39.06 |
| **Materials** | | | | | | |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 20 | $758.40 |

**Practice:** E340102Z - Cover crop to reduce wind erosion

**Scenario** #1 - Cover crop to reduce wind erosion

**Scenario Description:**

Cover crop added to current crop rotation to reduce soil erosion from wind to below the soil tolerance (T) level. Cover crops grown during critical erosion period(s). Species are selected that will have physical characteristics to provide adequate erosion protection.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $797.46

**Scenario Cost/Unit:** $7.97

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 1 | $39.06 |
| **Materials** | | | | | | |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 20 | $758.40 |

**Practice:** E340106Z1 - Intensive cover cropping to increase soil health and soil organic matter content

**Scenario** #1 - Cover cropping for SH and SOM

**Scenario Description:**

Use of cover crops in a cropping system to add diversity, keep the soil covered, and maintain a living root as long as possible. Cover crop will be used during ALL non-crop production periods in an annual crop rotation. Cover crop may be a single species or multi-species mix. Cover crop shall not be harvested or burned. Planned crop rotation including cover crops and associated management activities must achieve a soil conditioning index (SCI) of zero or higher and produce a positive trend in the Organic Matter (OM) subfactor over the life of the crop rotation. RUSLE2 or WEPS must be used to document SCI calculations. Cover crops may be grazed following a prescribed grazing plan that removes no more than 40% of the biomass produced.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,270.14

**Scenario Cost/Unit:** $12.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Two Species Mix, Cool Season Annual (1 grass and 1 legume) | 2314 | Cool season annual grass and legume mix. Includes material and shipping only. | Acre | $52.21 | 20 | $1,044.20 |

**Practice:** E340106Z2 - Use of multi-species cover crops to improve soil health and increase soil organic matter

**Scenario** #1 - Multi-species cover crops

**Scenario Description:**

Implement a multi-species cover crop to add diversity and increase biomass production to improve soil health and increased soil organic matter. Cover crop mix must include a minimum of 4 different species. The cover crop mix will increase diversity of the crop rotation by including crop types currently missing, e.g. Cool Season Grass (CSG), Cool Season Broadleaves (CSB), Warm Season Grasses (WSG), Warm Season Broadleaves (WSB).

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,237.52

**Scenario Cost/Unit:** $12.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 20 | $1,159.40 |

**Practice:** E340106Z3 - Intensive cover cropping (orchard/vineyard floor) to increase soil health and SOM content

**Scenario** #1 - Cover cropping for orchards/vineyards

**Scenario Description:**

Implementation of cover crops to provide orchard or vineyard floor coverage throughout the year. Cover crop shall not be harvested, grazed, or burned. Planned cover crop management activities must achieve a soil conditioning index (SCI) of zero or higher and produce a positive trend in the Organic Matter (OM) subfactor over the life of the crop rotation. RUSLE2 or WEPS must be used to document SCI calculations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,122.32

**Scenario Cost/Unit:** $11.22

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| **Materials** | | | | | | |
| Two Species Mix, Cool Season Annual (1 grass and 1 legume) | 2314 | Cool season annual grass and legume mix. Includes material and shipping only. | Acre | $52.21 | 20 | $1,044.20 |

**Practice:** E340106Z4 - Use of SHA to assist with development of cover crop mix to improve soil health and increase SOM

**Scenario** #1 - Soil health assessment

**Scenario Description:**

Use of a soil health assessment to evaluate impact of current conservation crop rotation in addressing soil organic matter depletion (primary assessment made in Year 1). Soil health assessment results will be utilized to determine the correct Carbon to Nitrogen ratio of a multi-species cover crop mix that will be added to the crop rotation. During Year 3 a follow up assessment will be completed to allow time for the addition of a cover crop to increased soil organic matter.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,484.98

**Scenario Cost/Unit:** $14.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 1 | $39.06 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 1 | $112.97 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 15 | $153.15 |
| Three Species Mix, Warm Season, Annual Grasses and Legumes | 2326 | Warm season annual grass and legume mix. Includes material and shipping only. | Acre | $58.99 | 20 | $1,179.80 |

**Practice:** E340107Z - Cover crop to minimize soil compaction

**Scenario** #1 - Cover crop to minimize soil compaction

**Scenario Description:**

Establish a cover crop mix that includes plants with both fibrous root and deep rooted systems. Fibrous to treat and prevent both near surface (0-4”) and deep (>4”) soil compaction and deep rooted to break up deep compacted soils. Cover crop shall not be harvested, grazed, or burned.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,083.26

**Scenario Cost/Unit:** $10.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 1 | $39.06 |
| **Materials** | | | | | | |
| Two Species Mix, Cool Season Annual (1 grass and 1 legume) | 2314 | Cool season annual grass and legume mix. Includes material and shipping only. | Acre | $52.21 | 20 | $1,044.20 |

**Practice:** E340118Z - Cover crop to reduce water quality degradation by utilizing excess soil nutrients-surface water

**Scenario** #1 - Cover crop for WQ nutrients-runoff

**Scenario Description:**

Establish a cover crop mix to take up excess soil nutrients. Select cover crop species for their ability to effectively utilize nutrients. Terminate the cover crop as late as practical to maximize plant biomass production and nutrient uptake. Cover crop shall not be harvested, grazed, or burned.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,083.26

**Scenario Cost/Unit:** $10.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 1 | $39.06 |
| **Materials** | | | | | | |
| Two Species Mix, Cool Season Annual (1 grass and 1 legume) | 2314 | Cool season annual grass and legume mix. Includes material and shipping only. | Acre | $52.21 | 20 | $1,044.20 |

**Practice:** E340119Z - Cover crop to reduce water quality degradation by utilizing excess soil nutrients-ground water

**Scenario** #1 - Cover crops for WQ nutrients-drainage

**Scenario Description:**

Establish a cover crop mix to take up excess soil nutrients. Select cover crop species for their ability to effectively utilize nutrients. Terminate the cover crop as late as practical to maximize plant biomass production and nutrient uptake. Cover crop shall not be harvested, grazed, or burned.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,083.26

**Scenario Cost/Unit:** $10.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 1 | $39.06 |
| **Materials** | | | | | | |
| Two Species Mix, Cool Season Annual (1 grass and 1 legume) | 2314 | Cool season annual grass and legume mix. Includes material and shipping only. | Acre | $52.21 | 20 | $1,044.20 |

**Practice:** E340134Z - Cover crop to suppress excessive weed pressures and break pest cycles

**Scenario** #1 - Cover crops for suppression

**Scenario Description:**

Establish a cover crop mix to suppress excessive weed pressures and break pest cycles. Select cover crop species for their life cycles, growth habits, and other biological, chemical and/or physical characteristics. Select cover crop species that do not harbor pests or diseases of subsequent crops in the rotation. Cover crop shall not be harvested, grazed, or burned.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,122.32

**Scenario Cost/Unit:** $11.22

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| **Materials** | | | | | | |
| Two Species Mix, Cool Season Annual (1 grass and 1 legume) | 2314 | Cool season annual grass and legume mix. Includes material and shipping only. | Acre | $52.21 | 20 | $1,044.20 |

**Practice:** E345101Z - Reduced tillage to reduce water erosion

**Scenario** #1 - Reduced tillage to reduce water erosion

**Scenario Description:**

Establish a reduced tillage system to reduce sheet and rill erosion soil loss. Field(s) must have a soil loss at or below the soil tolerance (T) level for water erosion for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 40 for each crop in the planned rotation. RUSLE2 must be used to calculate soil loss and STIR.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $451.88

**Scenario Cost/Unit:** $4.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |

**Practice:** E345102Z - Reduced tillage to reduce wind erosion

**Scenario** #1 - Reduced tillage to reduce wind erosion

**Scenario Description:**

Establish a reduced tillage system to reduce wind erosion soil loss. Field(s) must have a soil loss at or below the soil tolerance (T) level for wind erosion for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 40 for each crop in the planned rotation. WEPS must be used to calculate soil loss and STIR.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E345106Z - Reduced tillage to increase soil health and soil organic matter content

**Scenario** #1 - Reduced tillage for SH and SOM

**Scenario Description:**

Establish a reduced till system to increase soil health and soil organic matter content. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 80. The crop rotation must achieve a soil conditioning index (SCI) of zero or higher and produce a positive trend in the Organic Matter (OM) subfactor over the life of the crop rotation. RUSLE2 or WEPS must be used to document STIR and SCI calculations. Residue shall not be burned, grazed, or harvested.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $451.88

**Scenario Cost/Unit:** $4.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |

**Practice:** E345114Z - Reduced tillage to increase plant-available moisture: irrigation water

**Scenario** #1 - Reduced tillage for IWM

**Scenario Description:**

Establish a reduced till system to increase plant-available moisture. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 80. RUSLE2 or WEPS must be used to document STIR calculations. Maintain a minimum 60 percent surface residue cover throughout the year to reduce evaporation from the soil surface.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E345115Z - Reduced tillage to increase plant-available moisture: moisture management

**Scenario** #1 - Reduced tillage for moisture mgmt.

**Scenario Description:**

Establish a reduced till system to increase plant-available moisture. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 80. RUSLE2 or WEPS must be used to document STIR calculations. Maintain a minimum 60 percent surface residue cover throughout the year to reduce evaporation from the soil surface.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E345128Z - Reduced tillage to reduce tillage induced particulate matter

**Scenario** #1 - Reduced tillage to reduce PM

**Scenario Description:**

Establish a reduced tillage system to reduce tillage induced particulate matter. Field(s) must have a soil loss at or below the soil tolerance (T) level for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 40 for each crop in the planned rotation. RUSLE2 or WEPS must be used to document soil loss and STIR calculations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E345144Z - Reduced tillage to reduce energy use

**Scenario** #1 - Reduced tillage to reduce energy use

**Scenario Description:**

Establish a reduced tillage system which reduces total energy consumption associated with field operations by at least 25% compared to conventional tillage systems (benchmark). Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 80. RUSLE2 must be used to document STIR calculations and energy consumption. <State lists will be prepared providing conventional system benchmark energy values and reduced tillage system values for those systems using at least 25% less energy>

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E374144Z1 - Install variable frequency drive(s) on pump(s)

**Scenario** #1 - Variable frequency drives

**Scenario Description:**
Install Variable Frequency Drive(s) (CPS 533 Pumping Plant) with the correct sensors, on all pumps indicated in the energy audit.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 374 - Farmstead Energy Improvement

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 374 - Farmstead Energy Improvement

**Feature Measure:** Each

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $12,386.00

**Scenario Cost/Unit:** $247.72

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Variable Speed Drive, 50 HP | 1288 | Variable speed drive for 50 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $247.72 | 50 | $12,386.00 |

**Practice:** E374144Z2 - Switch fuel source for pump motor(s)

**Scenario** #1 - Switch fuel source for pump motor(s)

**Scenario Description:**
Switch fuel source for the pump motor(s) indicated in the audit to a renewable source (wind, solar, geothermal, etc..). (CPS 533 Pumping Plant)

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 374 - Farmstead Energy Improvement

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 374 - Farmstead Energy Improvement

**Feature Measure:** Horsepower

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $39,662.34

**Scenario Cost/Unit:** $7,932.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 12 | $468.72 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Pump, <= 5 HP, pump and motor, fixed cost portion | 1009 | Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes Includes material and shipping only. | Each | $564.23 | 1 | $564.23 |
| Pump, <= 5 HP, pump and motor, variable cost portion | 1010 | Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only. | Horsepower | $424.66 | 5 | $2,123.30 |
| Solar Panels, fixed cost portion | 1031 | Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment. | Each | $472.52 | 5 | $2,362.60 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment. | Kilowatt | $8,474.04 | 4 | $33,896.16 |

**Practice:** E376128Z - Modify field operations to reduce particulate matter

**Scenario** #1 - Mod field ops to reduce PM

**Scenario Description:**
Modify tillage and/or harvest operations to reduce particulates by at least 20 percent below the required levels.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 376 - Field Operations Emissions Reduction

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 376 - Field Operations Emissions Reduction

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $338.91

**Scenario Cost/Unit:** $3.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E381133Z - Silvopasture for wildlife habitat (structure and composition)

**Scenario** #1 - Silvopasture-structure and comp

**Scenario Description:**

Establishing a combination of trees or shrubs and compatible forages on the same acreage, providing forage for livestock and the production of wood products, and including a purpose of enhancing wildlife habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 381 - Silvopasture

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 381 - Silvopasture

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $7,766.70

**Scenario Cost/Unit:** $77.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 20 | $120.40 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 200 | $2,576.00 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 20 | $377.40 |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 200 | $334.00 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 20 | $4,264.40 |

**Practice:** E381137Z - Silvopasture for wildlife habitat (cover and shelter)

**Scenario** #1 - Silvopasture for wildlife habitat-food

**Scenario Description:**

Establishing a combination of trees or shrubs and compatible forages on the same acreage, providing forage for livestock and the production of wood products, and including a purpose of enhancing wildlife cover and shelter.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 381 - Silvopasture

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 381 - Silvopasture

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $8,263.10

**Scenario Cost/Unit:** $82.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 20 | $120.40 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 200 | $2,576.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 20 | $377.40 |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.67 | 200 | $334.00 |
| Tree, conifer, seedling, bare root, 3-0 | 1515 | Bare root conifer trees, 3-0 (3 years old). Includes materials and shipping only. | Each | $0.42 | 100 | $42.00 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 20 | $4,264.40 |

**Practice:** E382136Z - Incorporating "wildlife friendly" fencing for connectivity of wildlife food resources

**Scenario** #1 - Wildlife friendly fence for food access

**Scenario Description:**
Retrofitting or constructing fences that provide a means to control movement of animals, people, and vehicles, but minimizes wildlife movement impacts.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 382 - Fence

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 382 - Fence

**Feature Measure:** Acre

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $147.76

**Scenario Cost/Unit:** $0.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 1 | $27.76 |
| **Materials** | | | | | | |
| Vinyl Undersill Strips | 241 | Marking material using the "undersill" strips of vinyl siding. Priced per foot of fence per each wire. Materials only. | Foot | $0.06 | 2000 | $120.00 |

**Practice:** E383135Z - Grazing-maintained fuel break to reduce the risk of fire

**Scenario** #1 - Grazed fuel break

**Scenario Description:**

The property has existing fuel breaks of 30 to 60 feet in width. Warm-season perennial vegetation will be established on the fuel breaks, and will be over-seeded with cool-season annual forages in the fall. Grazing will be managed on the fuel break to remove or modify the fine fuel vegetation, to reduce the risk of fire spread from ground fires, maintain adequate soil cover, control erosion, and facilitate prescribed burning.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 383 - Fuel Break

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 383 - Fuel Break

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,671.77

**Scenario Cost/Unit:** $267.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.50 | 10 | $65.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 10 | $209.70 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 24 | $681.60 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.48 | 1000 | $480.00 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $44.94 | 10 | $449.40 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $61.84 | 10 | $618.40 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E384135Z - Biochar production from woody residue

**Scenario** #1 - Biochar production from woody residue

**Scenario Description:**

Utilizes woody debris remaining after fuel reduction harvests or wildfires to create biochar. Biochar stores carbon and is a useful soil amendment that improves SOM and water-holding capacity.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 384 - Woody Residue Treatment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 384 - Woody Residue Treatment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $10,097.96

**Scenario Cost/Unit:** $5,048.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 40 | $2,463.60 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 40 | $171.60 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 15 | $320.85 |
| Water tank, portable | 1602 | Portable water tank transported in a pick up truck. Typically with 200 gallon capacity includes tank with pump, hose and sprayer. Does not include the pickup truck. Equipment only. | Hour | $2.38 | 80 | $190.40 |
| Wood Processor | 2680 | Towable equipment used to cut and split wood, Daily rental rate. All materials and equipment included | Day | $189.21 | 5 | $946.05 |
| Biochar Kiln, open fire | 2681 | Open fire kiln or metal container used to produce biochar/charcoal production. Daily rental rate. Includes all material and equipment | Hour | $1.39 | 320 | $444.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 120 | $3,408.00 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 40 | $1,084.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 3 | $503.01 |

**Practice:** E386101Z - Enhanced field borders to reduce water induced erosion along the edge(s) of a field

**Scenario** #1 - Field borders to reduce water erosion

**Scenario Description:**

Enhance existing field borders to a width of at least 30 feet and establish a single specie or mixture of species that provide a dense ground cover along the edge(s) of the field.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $683.85

**Scenario Cost/Unit:** $683.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** E386102Z - Enhanced field borders to reduce wind induced erosion along the windward side(s) of a field

**Scenario** #1 - Field borders to reduce wind erosion

**Scenario Description:**

Enhance existing field borders to a width of at least 30 feet and establish a single specie or mixture of species that provide a dense ground cover along the edge(s) of the field.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $683.85

**Scenario Cost/Unit:** $683.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** E386106Z - Enhanced field borders to increase carbon storage along the edge(s) of the field

**Scenario** #1 - Field borders to increase carbon storage

**Scenario Description:**

Enhance existing field borders to a width of at least 30 feet and establish a single specie or mixture of species that provide a dense ground cover and dense rooting system along the edge(s) of the field.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $683.85

**Scenario Cost/Unit:** $683.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** E386128Z - Enhanced field borders to decrease particulate emissions along the edge(s) of the field

**Scenario** #1 - Field borders to decrease particulates

**Scenario Description:**
Enhance existing field borders to a width of at least 40 feet and establish a mixture of species that decrease the particulate emissions along the edge(s) of the field.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $683.85

**Scenario Cost/Unit:** $683.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** E386136Z - Enhanced field border to provide wildlife food for pollinators along the edge(s) of a field

**Scenario** #1 - Field border to provide wildlife food

**Scenario Description:**
Enhance existing field borders to a width of at least 40 feet and establish a mixture of species that provide food for pollinators along the edge(s) of the field.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $683.85

**Scenario Cost/Unit:** $683.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** E386137Z - Enhanced field border to provide wildlife cover or shelter along the edge(s) of a field

**Scenario** #1 - Field border to provide wildlife cover

**Scenario Description:**
Enhance existing field borders to a width of at least 40 feet and establish a mixture of species that provide wildlife food and cover along the edge(s) of the field.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $683.85

**Scenario Cost/Unit:** $683.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** E386139Z - Enhanced field border to provide wildlife habitat continuity along the edge(s) of a field

**Scenario** #1 - Field border to provide continuity

**Scenario Description:**
Enhance existing field borders to a width of at least 40 feet and establish a mixture of species that provide wildlife habitat continuity along the edge(s) of the field.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $683.85

**Scenario Cost/Unit:** $683.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** E390118Z - Increase riparian herbaceous cover width for nutrient reduction

**Scenario** #1 - Riparian herbaceous cover-nut reduction

**Scenario Description:**

Where an existing herbaceous riparian buffer is located along a river, stream, pond, lake, or other waterbody, increase the width of the buffer in order to allow a greater percentage of nutrient removal from surface and subsurface flows. Saturated buffer or nutrient control wetland to capture subsurface drainage.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $1,103.12

**Scenario Cost/Unit:** $551.56

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 2 | $12.04 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 2 | $41.94 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.82 | $323.21 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.72 | $247.07 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.46 | $91.92 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 2 | $75.66 |
| One Species, Cool Season, Native Perennial Grass | 2312 | Native, cool season perennial grass. Includes material and shipping only. | Acre | $155.64 | 2 | $311.28 |

**Practice:** E390126Z - Increase riparian herbaceous cover width to reduce sediment loading

**Scenario** #1 - Riparian herbaceous cover-seed loading

**Scenario Description:**

Where an existing herbaceous riparian buffer is located along a river, stream, pond, lake, or other waterbody, increase the width of the buffer in order to allow a greater percentage of nutrient removal from surface and subsurface flows.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $1,103.12

**Scenario Cost/Unit:** $551.56

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 2 | $12.04 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 2 | $41.94 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.82 | $323.21 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.72 | $247.07 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.46 | $91.92 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 2 | $75.66 |
| One Species, Cool Season, Native Perennial Grass | 2312 | Native, cool season perennial grass. Includes material and shipping only. | Acre | $155.64 | 2 | $311.28 |

**Practice:** E390136Z - Increase riparian herbaceous cover width to enhance wildlife habitat

**Scenario** #1 - Riparian herbaceous cover-habitat

**Scenario Description:**

Where an existing herbaceous riparian buffer is located along a river, stream, pond, lake, or other waterbody, increase the diversity of native species, control invasive species, install fencing and relocate equipment operations, trails, and livestock, and increase the width of the buffer.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $3,025.99

**Scenario Cost/Unit:** $756.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 4 | $24.08 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 2 | $41.94 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 1 | $394.16 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 1 | $343.15 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.46 | $91.92 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 4 | $151.32 |
| Specialized native grass and forb mix | 2619 | A mix of native grass and forbs to be used for specialized purposes such as wildlife (including pollinators) or ecosystem restoration, requiring species not readility available and/or difficult to produce and harvest. Includes material and shipping only | Acre | $989.71 | 2 | $1,979.42 |

**Practice:** E391118Z - Increase riparian forest buffer width for nutrient reduction

**Scenario** #1 - Riparian forest buffer-nut reduction

**Scenario Description:**

Where an existing forested riparian area is located along a river, stream, pond, lake, or other waterbody, increase the width of the buffer in order to allow a greater percentage of nutrient removal from surface and subsurface flows. Saturated buffer or nutrient control wetland to capture subsurface drainage.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $3,732.71

**Scenario Cost/Unit:** $1,866.35

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 16 | $342.24 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2 | $101.92 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 2 | $12.04 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 4 | $97.28 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 16 | $197.76 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.82 | $323.21 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.72 | $247.07 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.46 | $91.92 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4 | $108.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 1 | $26.78 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 872 | $723.76 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.22 | 100 | $422.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.07 | 100 | $207.00 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E391126Z - Increase riparian forest buffer width to reduce sediment loading

**Scenario** #1 - Riparian forest buffer-seed loading

**Scenario Description:**

Where an existing forested riparian area is located along a river, stream, pond, lake, or other waterbody, increase the width of the buffer in order to allow a greater percentage of nutrient removal from surface and subsurface flows.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $3,789.51

**Scenario Cost/Unit:** $1,894.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 16 | $342.24 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2 | $101.92 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 2 | $12.04 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 4 | $97.28 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 16 | $197.76 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.82 | $323.21 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.72 | $247.07 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.46 | $91.92 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 18 | $511.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4 | $108.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 1 | $26.78 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 872 | $723.76 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.22 | 100 | $422.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.07 | 100 | $207.00 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E391127Z - Increase stream shading for stream temperature reduction

**Scenario** #1 - Shade stream to reduce temp

**Scenario Description:**
Riparian area tree canopy cover density is increased and the extent of the forested riparian area is increased to provide greater stream shading.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $3,789.51

**Scenario Cost/Unit:** $1,894.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 16 | $342.24 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2 | $101.92 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 2 | $12.04 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 4 | $97.28 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 16 | $197.76 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.82 | $323.21 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.72 | $247.07 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.46 | $91.92 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 18 | $511.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4 | $108.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 1 | $26.78 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 872 | $723.76 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.22 | 100 | $422.00 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.07 | 100 | $207.00 |

**Mobilization**

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E391136Z - Increase riparian forest buffer width to enhance wildlife habitat

**Scenario** #1 - Riparian forest buffer-habitat

**Scenario Description:**

Where an existing forested riparian area is located along a river, stream, pond, lake, or other waterbody, increase the diversity of native species, control invasive species, install fencing and relocate equipment operations, trails, and livestock, and increase the width of the buffer.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $3,789.51

**Scenario Cost/Unit:** $1,894.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 16 | $342.24 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2 | $101.92 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 2 | $12.04 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 4 | $97.28 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 16 | $197.76 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.82 | $323.21 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.72 | $247.07 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.46 | $91.92 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 18 | $511.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4 | $108.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 1 | $26.78 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 872 | $723.76 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.22 | 100 | $422.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.07 | 100 | $207.00 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E393118Z - Extend existing filter strip to reduce excess nutrients in surface water

**Scenario** #1 - Extend filter strips- nut runoff

**Scenario Description:**

Extend existing filter strips for water quality protection (reduce excess nutrients in surface water). Extend the existing buffer for a total of 60 feet or more to enhance water quality functions. The extended buffers must be composed of at least 5 species of non-noxious, wildlife friendly grasses and/or perennial forbs best suited to site conditions. Include species that provide pollinator food and habitat where possible.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 393 - Filter Strip

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 393 - Filter Strip

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $909.79

**Scenario Cost/Unit:** $909.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** E393122Z - Extend existing filter strip to reduce excess pathogens and chemicals in surface water

**Scenario** #1 - Extend filter strips-pathogen runoff

**Scenario Description:**

Extend existing filter strips for water quality protection (reduce excess pathogens and chemicals from manure, bio-solids or compost applications in surface waters ). Extend the existing buffer for a total of 60 feet or more to enhance water quality functions. The extended buffers must be composed of at least 5 species of non-noxious, wildlife friendly grasses and/or perennial forbs best suited to site conditions. Include species that provide pollinator food and habitat where possible.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 393 - Filter Strip

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 393 - Filter Strip

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $909.79

**Scenario Cost/Unit:** $909.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** E393126Z - Extend existing filter strip to reduce excess sediment in surface water

**Scenario** #1 - Extend filter strips-sediment

**Scenario Description:**

Extend existing filter strips for water quality protection (reduce excess sediment in surface waters ). Extend the existing buffer for a total of 60 feet or more to enhance water quality functions. The extended buffers must be composed of at least 5 species of non-noxious, wildlife friendly grasses and/or perennial forbs best suited to site conditions. Include species that provide pollinator food and habitat where possible.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 393 - Filter Strip

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 393 - Filter Strip

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $909.79

**Scenario Cost/Unit:** $909.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.94 | 1 | $10.94 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.56 | 1 | $7.56 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $57.97 | 1 | $57.97 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E395137X - Stream habitat improvement through placement of woody biomass

**Scenario** #1 - Stream habitat improvement with wood

**Scenario Description:**

Flexible placement of wood (unanchored/unpinned) in small, 1st and 2nd order streams to improve stream habitat conditions for aquatic species and natural stream processes.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 395 - Stream Habitat Improvement and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 395 - Stream Habitat Improvement and Management

**Feature Measure:** Bankfull width X Length

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $20,951.04

**Scenario Cost/Unit:** $20,951.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $161.44 | 16 | $2,583.04 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 8 | $759.60 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $40.16 | 24 | $963.84 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $28.11 | 20 | $562.20 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 30 | $854.70 |
| Compost | 265 | A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients. | Ton | $41.44 | 1 | $41.44 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.74 | 300 | $5,322.00 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.95 | 40 | $1,398.00 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.53 | 50 | $26.50 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 15 | $358.50 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $231.59 | 30 | $6,947.70 |
| Root Wad | 2045 | Tree stump buried into the streambank with the roots left exposed. Includes material only. | Ton | $9.08 | 20 | $181.60 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 2 | $951.92 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E399137X - Fishpond management for native aquatic and terrestrial species

**Scenario** #1 - Fishpond mgmt.

**Scenario Description:**

Pond rehabilitation (e.g., dredging), buffer, and watershed management actions are taken to improve habitat for native species of fish, amphibians, and shorebirds.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 399 - Fishpond Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 399 - Fishpond Management

**Feature Measure:** Pond area + buffer area

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $3,764.54

**Scenario Cost/Unit:** $1,882.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 1 | $20.97 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 3 | $117.18 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 1 | $37.83 |
| Herbicide, Diquat dibromide | 1820 | Aquatic herbicide and plant growth regulator. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Gallon | $110.80 | 1 | $110.80 |
| Native Aquatic Plants, Emergent or Submerged | 2336 | Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping. | Each | $1.32 | 1000 | $1,320.00 |
| Specialized native grass and forb mix | 2619 | A mix of native grass and forbs to be used for specialized purposes such as wildlife (including pollinators) or ecosystem restoration, requiring species not readility available and/or difficult to produce and harvest. Includes material and shipping only | Acre | $989.71 | 1 | $989.71 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E449114Z5 - Complete pumping plant evaluation for all existing pumps on a farm.

**Scenario** #10 - Pumping Plant Evaluation

**Scenario Description:**

Evaluation of all pumping plants to determine the potential to rehabilitate/replace/reconfigure to perform 10% more efficiently. Evaluate to determine if a Variable Frequency Drive motor controller(s) is recommended and the simple payback in terms of energy savings is less than 10 years.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 449 – Irrigation Water Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in the Conservation Practice Standard, (CPS) 449 – Irrigation Water Management.

**Feature Measure:** Acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 640.0

**Scenario Total Cost:** $3,996.36

**Scenario Cost/Unit:** $6.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 32 | $3,615.04 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |

**Practice:** E449114Z6 - Automated Intermittent flood irrigation of rice fields, Year 2-5

**Scenario** #10 - Automated Intermittent flood irrigation of rice fields, Year 2-5

**Scenario Description:**

Rice fields are drained and allowed to “dry down” to a saturated soil condition prior to re-flooding the field. System is installed in year 1 with Scenario E449114Z8 and this scenario used in years 2-5.

**Before Situation:**

Resources are protected at the minimum level of the conservation Practice Standard (CPS) 449 – Irrigation Water Management.

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in the Conservation Practice Standard (CPS) 449 – Irrigation Water Management.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $1,419.50

**Scenario Cost/Unit:** $35.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 40 | $1,136.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |

**Practice:** E449114Z7 - Advanced Automated IWM – Year 2-5, Soil moisture is monitored, recorded and used in decision making

**Scenario** #10 - Advanced Automated IWM – Year 2-5, soil moisture monitoring

**Scenario Description:**

Advanced automated irrigation water management using soil moisture monitoring (one sensor per 40 acres or less) with data loggers. Record keeping is such that a daily water balance is calculated and future irrigation is forecast. Equipment was bought in year one, this is monitoring for future years. Subscription service may be used as source for monitoring. System will be monitored and controlled using remote devices.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 449 – Irrigation Water Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 449 – Irrigation Water Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 125.0

**Scenario Total Cost:** $2,696.40

**Scenario Cost/Unit:** $21.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 40 | $1,562.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 24 | $1,134.00 |

**Practice:** E449114Z8 - Advanced Automated IWM – Year 1 – Equipment and soil moisture is monitored, recorded and used in decision making

**Scenario** #10 - Advanced Automated IWM – Year 1 Equipment and soil moisture monitoring

**Scenario Description:**

Year 1 is used to purchase equipment to do advanced automated irrigation water management. System incuses field specific weather station data with soil moisture monitoring (one sensor station per 40 acres or less) data loggers and telemetry. Sensor stations will included minimum of 2 sensors per site at depths appropriate for the crop and soils. Equipment may include; weather station, sensors, flow meter, data loggers, as needed to monitor soil moisture, determine and forecast crop water use and remotely control irrigation system. Data to be monitored includes crop water use, status of heat and/or frost conditions to permit the producer to make informed irrigation decisions. The installation includes the purchase and installation of equipment, and a data logger to log continuous weather data including rainfall, temp, solar radiation, humidity, wind speed and soil moisture sensors that can be downloaded to a personal computer and associated graphing software. Typical Scenario involves installation on a 120 acre field of irrigated cropland. Producer monitors the station during the growing season to determine timing and amounts of water to apply based on soil moisture sensors, field checks and weather station data. Producer keeps records of collected data and resulting irrigation decisions. This scenario only applies to year one of IWM. The appropriate labor-only IWM scenarios apply in subsequent contract years.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 449 – Irrigation Water Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 449 – Irrigation Water Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $6,974.13

**Scenario Cost/Unit:** $58.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 30 | $641.70 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 8 | $312.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 16 | $756.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |
| **Materials** | | | | | | |
| Switches and Controls, temp sensors | 1192 | Temperature and soil moisture sensors installed as part of an electronic monitoring (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $666.86 | 3 | $2,000.58 |
| Data Logger with Telemetry System | 1454 | Data Logger W/Graphic Output for water management and telemetry - data communication device with power supply in a weather proof enclosure. Equipment only. | Each | $1,723.25 | 1 | $1,723.25 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring . | Each | $1,088.24 | 1 | $1,088.24 |

**Practice:** E449144Z - Complete pumping plant evaluation for all pumps on a farm.

**Scenario** #1 - Pumping plant evaluation

**Scenario Description:**
Rehabilitate/replace/reconfigure all pumps that have the potential to perform 10% more efficiently as identified in the pump test.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 449 - Irrigation Water Management

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 449 - Irrigation Water Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 640.0

**Scenario Total Cost:** $3,615.29

**Scenario Cost/Unit:** $5.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price). | Hour | $91.91 | 35 | $3,216.85 |
| CAP Labor, Skilled | 1604 | Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $32.96 | 10 | $329.60 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $68.84 | 1 | $68.84 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E472118Z - Manage livestock access to streams/ditches/other waterbodies to reduce nutrients in surface water

**Scenario** #1 - Livestock access to waterbody-nutrients

**Scenario Description:**

Installation of structures and implementation of grazing management actions that restrict livestock access to streams, ditches, and other waterbodies in order to reduce nutrient loading to surface waters.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 472 - Access Control

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 472 - Access Control

**Feature Measure:** (Stream length protected * 2) + ((C

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,320.0

**Scenario Total Cost:** $3,221.64

**Scenario Cost/Unit:** $2.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 5 | $35.90 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 5 | $106.95 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 5 | $121.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 33 | $937.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 5 | $135.60 |
| **Materials** | | | | | | |
| Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll | 1 | Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only. | Each | $72.51 | 4 | $290.04 |
| Post, Wood, CCA treated, 3-4" x 7' | 9 | Wood Post, Line 3-4" X 7', CCA Treated. Includes materials and shipping only. | Each | $6.38 | 20 | $127.60 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.38 | 8 | $123.04 |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.81 | 90 | $612.90 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 1320 | $224.40 |
| Gate, Pipe, 12' | 1057 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $169.37 | 2 | $338.74 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E472122Z - Manage livestock access to streams/ditches/other waterbodies to reduce pathogens in surface water

**Scenario** #1 - Livestock access to waterbody-pathogens

**Scenario Description:**

Installation of structures and implementation of grazing management actions that restrict livestock access to streams, ditches, and other waterbodies in order to reduce the introduction of pathogens to surface waters.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 472 - Access Control

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 472 - Access Control

**Feature Measure:** (Stream length protected * 2) + ((C

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,320.0

**Scenario Total Cost:** $3,221.64

**Scenario Cost/Unit:** $2.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 5 | $35.90 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 5 | $106.95 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 5 | $121.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 33 | $937.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 5 | $135.60 |
| **Materials** | | | | | | |
| Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll | 1 | Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only. | Each | $72.51 | 4 | $290.04 |
| Post, Wood, CCA treated, 3-4" x 7' | 9 | Wood Post, Line 3-4" X 7', CCA Treated. Includes materials and shipping only. | Each | $6.38 | 20 | $127.60 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.38 | 8 | $123.04 |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.81 | 90 | $612.90 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 1320 | $224.40 |
| Gate, Pipe, 12' | 1057 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $169.37 | 2 | $338.74 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E484106Z - Mulching to improve soil health

**Scenario** #1 - Mulching to improve soil health

**Scenario Description:**

Implement a crop rotation which utilizes mulch and addresses all four principle components of soil health: increases diversity of the cropping system; maintains residue throughout the year; keeps a living root; and minimizes soil chemical, physical and biological disturbance. Plant-based mulching materials will be applied at least once during the rotation. The rotation will include at least 4 different crop and/or cover crop types (crop types include cool season grass, warm season grass, cool season broadleaf, warm season broadleaf) grown in a sequence that will produce a positive trend in the Organic Matter (OM) subfactor value over the life of the rotation, as determined by the Soil Conditioning Index (SCI). RUSLE2 or WEPS must be used to document the rotation and SCI calculations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 484 - Mulching

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 484 - Mulching

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $225.94

**Scenario Cost/Unit:** $2.26

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |

**Practice:** E511137Z1 - Harvest of crops (hay or small grains) using measures that allow desired species to flush or escape

**Scenario** #1 - Harvest using wildlife friendly methods

**Scenario Description:**

Harvest of crops (hay or small grains) using conservation measures that allow desired species to flush or escape. <species list State Wildlife Action Plan> Conservation measures include timing of harvest, idling land during the nesting or fawning period, and applying harvest techniques that reduce mortality to wildlife.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $207.13

**Scenario Cost/Unit:** $4.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Hay, General Grass | 2122 | General Grass Hay is Primary Land Use | Ton | $43.24 | 1.67 | $72.21 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |

**Practice:** E511137Z2 - Forage harvest management that helps maintain or improve wildlife habitat (cover and shelter)

**Scenario** #1 - FHM for cover and shelter

**Scenario Description:**

The timely cutting and removal of forages from the field as hay, green-chop, or ensilage in such as way and time frames so as optimize both forage yield/quality and wildlife cover and shelter.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $369.25

**Scenario Cost/Unit:** $3.69

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 25 | $322.00 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |

**Practice:** E511139Z2 - Forage harvest management that helps maintain wildlife habitat continuity (space)

**Scenario** #1 - FHM for habitat space continuity

**Scenario Description:**

The timely cutting and removal of forages from the field as hay, green-chop, or ensilage in such as way and time frames so as optimize both forage yield/quality and wildlife cover and shelter for habitat and/or continuity between otherwise disconnected habitats.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $207.13

**Scenario Cost/Unit:** $4.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Hay, General Grass | 2122 | General Grass Hay is Primary Land Use | Ton | $43.24 | 1.67 | $72.21 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |

**Practice:** E512101Z1 - Cropland conversion to grass-based agriculture to reduce water erosion

**Scenario** #1 - Convert crop to grass for water erosion

**Scenario Description:**

Conversion of cropped land to grass-based agriculture. Mixtures of perennial grasses, forbs, and/or legume species are established on cropland where annually-seeded cash crops have been grown.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $507.70

**Scenario Cost/Unit:** $5.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2319 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $20.66 | 20 | $413.20 |

**Practice:** E512101Z2 - Forage and biomass planting for water erosion to improve soil health

**Scenario** #1 - Forage planting for SH

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production that can provide for reduced soil erosion, improving soil health.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,463.30

**Scenario Cost/Unit:** $14.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $68.44 | 20 | $1,368.80 |

**Practice:** E512102Z - Cropland conversion to grass-based agriculture to reduce wind erosion

**Scenario** #1 - Convert crop to grass for wind erosion

**Scenario Description:**

Conversion of cropped land to grass-based agriculture. Mixtures of perennial grasses, forbs, and/or legume species are established on cropland where annually-seeded cash crops have been grown.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,113.35

**Scenario Cost/Unit:** $11.13

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 5 | $1,066.10 |

**Practice:** E512106Z1 - Cropland conversion to grass-based agriculture for soil organic matter improvement

**Scenario** #1 - Convert crop to grass for SOM

**Scenario Description:**

Conversion of cropped land to grass-based agriculture. Mixtures of perennial grasses, forbs, and/or legume species are established on cropland where annually-seeded cash crops have been grown.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,466.68

**Scenario Cost/Unit:** $14.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 2 | $56.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |
| **Materials** | | | | | | |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 20 | $958.00 |

**Practice:** E512106Z2 - Forage plantings that can help increase organic matter in depleted soils

**Scenario** #1 - Forage planting for SOM

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production that can help improve soil quality of depleted sites through increase or conservation of the organic matter in the soil.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,374.50

**Scenario Cost/Unit:** $13.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 25 | $322.00 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $47.90 | 20 | $958.00 |

**Practice:** E512132Z1 - Forage and biomass planting that produces feedstock for biofuels or energy production

**Scenario** #1 - Forage planting for feedstocks

**Scenario Description:**

Conversion of cropped land to grass-based agriculture. Mixtures of perennial grasses, forbs, and/or legume species are established on cropland where annually-seeded cash crops have been grown.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,647.94

**Scenario Cost/Unit:** $36.48

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $68.44 | 50 | $3,422.00 |

**Practice:** E512132Z2 - Native grasses or legumes in forage base to improve plant productivity and health

**Scenario** #1 - Native grasses/legumes-plant health

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide the structure and composition needed to enhance livestock and wildlife habitat, particularly when targeted forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,160.60

**Scenario Cost/Unit:** $21.61

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1 | $28.40 |
| **Materials** | | | | | | |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 10 | $2,132.20 |

**Practice:** E512133Z1 - Native grasses or legumes in forage base to improve plant community structure and composition

**Scenario** #1 - Native grasses/legumes-structure/comp

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide the structure and composition needed to enhance livestock and wildlife habitat, particularly when targeted forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $5,556.44

**Scenario Cost/Unit:** $55.56

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 25 | $5,330.50 |

**Practice:** E512133Z2 - Forage plantings that enhance bird habitat (structure and composition)

**Scenario** #1 - Forage planting for structure/comp

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production that can provide cover and shelter components of bird habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $7,452.22

**Scenario Cost/Unit:** $74.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $68.44 | 25 | $1,711.00 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $566.31 | 10 | $5,663.10 |

**Practice:** E512136Z1 - Establish pollinator and/or beneficial insect food habitat

**Scenario** #1 - Establish pollinator habitat-food

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species that can provide nectar for pollinators and forage and other habitat values for wildlife and livestock, particularly at times when targeted nectar, forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $5,776.07

**Scenario Cost/Unit:** $57.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 1 | $112.97 |
| **Materials** | | | | | | |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $566.31 | 10 | $5,663.10 |

**Practice:** E512136Z2 - Native grass or legumes in forage base to provide wildlife food

**Scenario** #1 - Native grasses/legumes-wildlife food

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide the structure and composition needed to enhance livestock and wildlife habitat, particularly when targeted forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $5,776.07

**Scenario Cost/Unit:** $57.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 1 | $112.97 |
| **Materials** | | | | | | |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $566.31 | 10 | $5,663.10 |

**Practice:** E512137Z - Forage plantings that enhance bird habitat (cover and shelter)

**Scenario** #1 - Forage planting for cover and shelter

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production that can provide cover and shelter components of bird habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $7,452.22

**Scenario Cost/Unit:** $74.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 2 | $78.12 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $68.44 | 25 | $1,711.00 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $566.31 | 10 | $5,663.10 |

**Practice:** E512138Z - Establish wildlife corridors to enhance access to water

**Scenario** #1 - Corridors for water access

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide cover needed for wildlife species of concern to move from food/cover/water sources to other food/cover/water sources as needed for their life cycles, and/or to enhance the utility of underused wildlife habitat areas.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,548.70

**Scenario Cost/Unit:** $25.49

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 25 | $322.00 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 10 | $2,132.20 |

**Practice:** E512139Z1 - Establish wildlife corridors to provide habitat continuity

**Scenario** #1 - Corridors for habitat continuity

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide cover needed for wildlife species of concern to move from food/cover/water sources to other food/cover/water sources as needed for their life cycles, and/or to enhance the utility of underused wildlife habitat areas.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,470.70

**Scenario Cost/Unit:** $24.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 10 | $209.70 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 10 | $128.80 |
| **Materials** | | | | | | |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 10 | $2,132.20 |

**Practice:** E512139Z2 - Establish pollinator and/or beneficial insect habitat continuity (space)

**Scenario** #1 - Establish pollinator habitat-space

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species that can provide nectar for pollinators and forage and other habitat values for wildlife and livestock, particularly at times when targeted nectar, forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $5,889.04

**Scenario Cost/Unit:** $58.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $566.31 | 10 | $5,663.10 |

**Practice:** E512139Z3 - Establish Monarch butterfly habitat in pastures

**Scenario** #1 - Establish Monarch Butterfly Habitat in pastures

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species that can provide nectar for Monarch butterflies and forage and other habitat values for wildlife and livestock, particularly at times when targeted nectar, forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $5,889.04

**Scenario Cost/Unit:** $58.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $566.31 | 10 | $5,663.10 |

**Practice:** E512140Z - Native grasses or legumes in forage base

**Scenario** #1 - Native grasses or legumes in forage base

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide the structure and composition needed to enhance livestock and wildlife habitat, particularly when targeted forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $5,425.00

**Scenario Cost/Unit:** $54.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $213.22 | 25 | $5,330.50 |

**Practice:** E528101Z - Improved grazing management for water erosion through monitoring activities

**Scenario** #1 - Grazing mgmt. for water erosion

**Scenario Description:**

Three predominant key grazing areas are evaluated utilizing the Rangeland Health Assessment protocols to determine how well the ecological processes of the site(s) are functioning. Departure from reference categories will be determined, justified, and ratings described for soil and site stability, hydrologic function, and biotic integrity. Utilizing knowledge learned from this as a part of the ranch resource assessment, a Certified Range Management Consultant or Certified Professional in Range Management will provide recommendations or follow-up evaluations toward mitigating some of the degradation risks that are initially identified.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,115.72

**Scenario Cost/Unit:** $2.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |

**Practice:** E528102Z - Improved grazing management for wind erosion through monitoring activities

**Scenario** #10 - Grazing mgmt. for wind erosion

**Scenario Description:**

Three predominant key grazing areas are evaluated utilizing the Rangeland Health Assessment protocols to determine how well the ecological processes of the site(s) are functioning. Departure from reference categories will be determined, justified, and ratings described for soil and site stability, hydrologic function, and biotic integrity. Utilizing knowledge learned from this as a part of the ranch resource assessment, a Certified Range Management Consultant or Certified Professional in Range Management will provide recommendations or follow-up evaluations toward mitigating some of the degradation risks that are initially identified.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,115.72

**Scenario Cost/Unit:** $2.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |

**Practice:** E528104Z - Grazing management that protects sensitive areas from gully erosion

**Scenario** #1 - Grazing mgmt.-sensitive areas-erosion

**Scenario Description:**
Grazing management employed will provide cover and density needed in the watershed in order to protect sensitive areas such as sinkholes, streams, highly erodible areas, or locations with plants that cannot tolerate defoliation.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $1,699.62

**Scenario Cost/Unit:** $1.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 12 | $333.12 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 17 | $482.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polytape | 7 | Wire, Polytape for electric fence. Rolls of 655' to 825'. Includes materials and shipping only. | Each | $51.00 | 1 | $51.00 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |

**Practice:** E528105Z - Prescribed grazing that improves or maintains riparian and watershed function-erosion

**Scenario** #1 - Prescribed grazing-erosion

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to reduce runoff, improve infiltration, provide for above ground water filtration and sustain applicable fish and wildlife species habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $946.14

**Scenario Cost/Unit:** $9.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 10 | $128.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 1 | $48.49 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |

**Practice:** E528107Z1 - Improved grazing management for soil compaction through monitoring activities

**Scenario** #1 - Grazing mgmt. to improve compaction

**Scenario Description:**

Managing the harvest of vegetation with grazing and/or browsing animals as adjusted when following recommendations of a Certified Forage and Grassland Professional, Certified Range Management Consultant, or Certified Professional in Range Management, generated through pasture condition scoring (PCS).

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $788.78

**Scenario Cost/Unit:** $7.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 10 | $128.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |

**Practice:** E528107Z2 - Improved grazing management for soil compaction on rangeland through monitoring activities

**Scenario** #1 - Grazing mgmt.-compaction on rangeland

**Scenario Description:**

Three predominant key grazing areas are evaluated utilizing the Rangeland Health Assessment protocols to determine how well the ecological processes of the site(s) are functioning. Departure from reference categories will be determined, justified, and ratings described for soil and site stability, hydrologic function, and biotic integrity. Utilizing knowledge learned from this as a part of the ranch resource assessment, a Certified Range Management Consultant or Certified Professional in Range Management will provide recommendations or follow-up evaluations toward mitigating some of the degradation risks that are initially identified.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,115.72

**Scenario Cost/Unit:** $2.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E528118Z1 - Prescribed grazing that maintains/improves riparian/watershed function impairment from nutrients

**Scenario** #1 - Prescribed grazing-nut runoff

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to reduce runoff, improve infiltration, provide for above ground water filtration and sustain applicable fish and wildlife species habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,506.44

**Scenario Cost/Unit:** $15.06

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 6 | $166.56 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 10 | $128.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 4 | $193.96 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |

**Practice:** E528118Z2 - Grazing management that protects sensitive areas-surface water from nutrients

**Scenario** #1 - Grazing mgmt.-sensitive areas-nut runoff

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to protect sensitive areas such as sinkholes, streams, highly erodible areas, or locations with plants that cannot tolerate defoliation.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $1,852.62

**Scenario Cost/Unit:** $1.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 12 | $333.12 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 17 | $482.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polytape | 7 | Wire, Polytape for electric fence. Rolls of 655' to 825'. Includes materials and shipping only. | Each | $51.00 | 4 | $204.00 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |

**Practice:** E528119Z - Grazing management that protects sensitive areas-ground water from nutrients

**Scenario** #1 - Grazing mgmt.-sensitive area-nut sub water

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to protect sensitive areas such as sinkholes, streams, highly erodible areas, or locations with plants that cannot tolerate defoliation.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $1,852.62

**Scenario Cost/Unit:** $1.85

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 12 | $333.12 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 17 | $482.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polytape | 7 | Wire, Polytape for electric fence. Rolls of 655' to 825'. Includes materials and shipping only. | Each | $51.00 | 4 | $204.00 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |

**Practice:** E528122Z - Prescribed grazing that maintains/improves riparian/watershed function-pathogens/chemicals

**Scenario** #1 - Prescribed grazing-pathogens

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to reduce runoff, improve infiltration, provide for above ground water filtration and sustain applicable fish and wildlife species habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,506.44

**Scenario Cost/Unit:** $15.06

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 6 | $166.56 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 10 | $128.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 4 | $193.96 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E528126Z - Prescribed grazing that maintains/improves riparian/watershed function-min sediment in surface water

**Scenario** #1 - Prescribed grazing-sediment

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to reduce runoff, improve infiltration, provide for above ground water filtration and sustain applicable fish and wildlife species habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,377.64

**Scenario Cost/Unit:** $13.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 6 | $166.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 4 | $193.96 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E528132Z2 - Stockpiling cool season forage to improve plant productivity and health

**Scenario** #1 - Stockpile cool season forage-plant prod

**Scenario Description:**

Grazing management employed to stop grazing events of selected paddock(s) to allow pasture forages to grow to maximum vegetative biomass accumulation before the end of the growing season.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,351.60

**Scenario Cost/Unit:** $23.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 6 | $166.56 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 10 | $128.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 1 | $48.49 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.48 | 2000 | $960.00 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 3 | $30.63 |

**Practice:** E528132Z3 - Improved grazing management for plant productivity/health through monitoring

**Scenario** #1 - Gazing mgmt.-plant health

**Scenario Description:**

Three predominant key grazing areas are evaluated utilizing the Rangeland Health Assessment protocols to determine how well the ecological processes of the site(s) are functioning. Departure from reference categories will be determined, justified, and ratings described for soil and site stability, hydrologic function, and biotic integrity. Utilizing knowledge learned from this as a part of the ranch resource assessment, a Certified Range Management Consultant or Certified Professional in Range Management will provide recommendations or follow-up evaluations toward mitigating some of the degradation risks that are initially identified.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,115.72

**Scenario Cost/Unit:** $2.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E528133Z1 - Stockpiling cool season forage to improve structure and composition.

**Scenario** #1 - Stockpile cool season forage-structure

**Scenario Description:**

Grazing management employed will stop grazing events of selected paddock(s) to allow pasture forages to grow to maximum vegetative biomass accumulation before the end of the growing season.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,351.60

**Scenario Cost/Unit:** $23.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 6 | $166.56 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 10 | $128.80 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 1 | $48.49 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.48 | 2000 | $960.00 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 3 | $30.63 |

**Practice:** E528133Z2 - Grazing management for improving quantity/quality of plant structure/composition for wildlife

**Scenario** #1 - Grazing mgmt.-structure for wildlife

**Scenario Description:**

Managing the harvest of vegetation with grazing and/or browsing animals for the purpose of improving or maintaining the structure and composition of the plant community that is available for wildlife.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $240.45

**Scenario Cost/Unit:** $2.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 15 | $193.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |

**Practice:** E528133Z3 - Improved grazing management for plant structure and composition through monitoring activities

**Scenario** #1 - Grazing mgmt.-structure

**Scenario Description:**

Three predominant key grazing areas are evaluated utilizing the Rangeland Health Assessment protocols to determine how well the ecological processes of the site(s) are functioning. Departure from reference categories will be determined, justified, and ratings described for soil and site stability, hydrologic function, and biotic integrity. Utilizing knowledge learned from this as a part of the ranch resource assessment, a Certified Range Management Consultant or Certified Professional in Range Management will provide recommendations or follow-up evaluations toward mitigating some of the degradation risks that are initially identified.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,115.72

**Scenario Cost/Unit:** $2.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |

**Practice:** E528134Z - Improved grazing management that reduces undesirable plant pest pressure through monitoring

**Scenario** #1 - Grazing mgmt.-pest pressure

**Scenario Description:**

Three predominant key grazing areas are evaluated utilizing the Rangeland Health Assessment protocols to determine how well the ecological processes of the site(s) are functioning. Departure from reference categories will be determined, justified, and ratings described for soil and site stability, hydrologic function, and biotic integrity. Utilizing knowledge learned from this as a part of the ranch resource assessment, a Certified Range Management Consultant or Certified Professional in Range Management will provide recommendations or follow-up evaluations toward mitigating some of the degradation risks that are initially identified.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,115.72

**Scenario Cost/Unit:** $2.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |

**Practice:** E528136Z1 - Grazing management for improving quantity and quality of food for wildlife

**Scenario** #1 - Grazing mgmt.-food

**Scenario Description:**
Grazing management employed will provide plant structure, density and diversity needed for the desired wildlife species of concern.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $537.50

**Scenario Cost/Unit:** $0.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |

**Practice:** E528136Z2 - Incorporating wildlife refuge areas in contingency plans for wildlife food

**Scenario** #1 - Add wildlife refuge area-food

**Scenario Description:**

A prescribed grazing plan that includes 18 month (or longer) deferment of a pasture that consists of native grasses and/or legumes and/or perennial forbs for the purpose of meeting the needs for drought/disaster contingency plans that will also provide wildlife habitat for a period of time.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,570.84

**Scenario Cost/Unit:** $15.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 6 | $166.56 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 15 | $193.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 4 | $193.96 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |

**Practice:** E528136Z3 - Grazing management that improves Monarch butterfly habitat

**Scenario** #1 - Grazing mgmt.-Monarch

**Scenario Description:**

Implement a grazing management plan that will increase the abundance and diversity of monarch nectar-producing perennial forbs, including milkweed, while maintaining ecosystem benefits for other wildlife and livestock.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $872.04

**Scenario Cost/Unit:** $8.72

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 2.5 | $32.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 1 | $28.40 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 1 | $48.49 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 2 | $650.70 |

**Practice:** E528137Z1 - Grazing management for improving quantity and quality of cover and shelter for wildlife

**Scenario** #1 - Grazing mgmt.-shelter

**Scenario Description:**
Grazing management employed will provide plant structure, density and diversity needed for the desired wildlife species of concern.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $537.50

**Scenario Cost/Unit:** $0.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 10 | $472.50 |

**Practice:** E528137Z2 - Incorporating wildlife refuge areas in contingency plans for prescribed grazing-cover/shelter

**Scenario** #1 - Add wildlife refuge area-shelter

**Scenario Description:**

A prescribed grazing plan that includes 12 month (or longer) deferment of a pasture that consists of native grasses and/or legumes and/or perennial forbs for the purpose of meeting the needs for drought/disaster contingency plans that will also provide wildlife habitat for a period of time.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,570.84

**Scenario Cost/Unit:** $15.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 6 | $166.56 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 15 | $193.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 4 | $193.96 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |

**Practice:** E528138Z - Incorporating wildlife refuge areas in contingency plans for prescribed grazing-water access

**Scenario** #1 - Add wildlife refuge area-water

**Scenario Description:**

A prescribed grazing plan that includes 12 month (or longer) deferment of a pasture that consists of native grasses and/or legumes and/or perennial forbs for the purpose of meeting the needs for drought/disaster contingency plans that will also provide wildlife habitat for a period of time.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,570.84

**Scenario Cost/Unit:** $15.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 6 | $166.56 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 15 | $193.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 4 | $193.96 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |

**Practice:** E528140Z1 - Maintaining quantity and quality of forage for animal health and productivity

**Scenario** #1 - Maintain forage quantity and quality

**Scenario Description:**

Managing the harvest of vegetation with grazing and/or browsing animals for the purposes of maintaining desired pasture composition/plant vigor and improving/maintaining quantity and quality of forage for the animals' health and productivity..

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $3,762.61

**Scenario Cost/Unit:** $3.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 12 | $333.12 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 36 | $463.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 17 | $482.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 12 | $1,355.64 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 1 | $48.49 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |
| Nutritional Balance Analyzer, fecal sample analysis only | 1127 | NIRS fecal analysis, animal performance report. Includes materials and shipping only. | Each | $41.03 | 6 | $246.18 |

**Practice:** E528140Z2 - Incorporating wildlife refuge areas in contingency plans for livestock feed and forage

**Scenario** #1 - Add wildlife refuge area-forage

**Scenario Description:**

A prescribed grazing plan that includes 18 month (or longer) deferment of a pasture that consists of native grasses and/or legumes and/or perennial forbs for the purpose of meeting the needs for drought/disaster contingency plans that will also provide wildlife habitat for a period of time.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,538.10

**Scenario Cost/Unit:** $2.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $65.00 | 1 | $65.00 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 4 | $85.56 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 12 | $333.12 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 54 | $695.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 17 | $482.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $48.49 | 4 | $193.96 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $325.35 | 1 | $325.35 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $262.29 | 1 | $262.29 |

**Practice:** E550106Z - Range planting for increasing/maintaining organic matter

**Scenario** #1 - Range planting for SOM

**Scenario Description:**

Establishment of adapted perennial or self-sustaining vegetation such as grasses, forbs, legumes, shrubs and trees for the purpose of increasing or maintaining organic matter levels in the soil.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 550 - Range Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 550 - Range Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,069.50

**Scenario Cost/Unit:** $40.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $12.88 | 15 | $193.20 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| **Materials** | | | | | | |
| Native Grass and Forb Mix, for Wildlife (including pollinators) or Ecosystem Restoration | 2335 | Native grass and forb/legume mix, including specialized species. Includes material and shipping only. | Acre | $252.12 | 15 | $3,781.80 |

**Practice:** E550136Z - Range planting for improving forage, browse, or cover for wildlife

**Scenario** #1 - Range planting for wildlife

**Scenario Description:**

Establishment of adapted perennial or self-sustaining vegetation such as grasses, forbs, legumes, shrubs and trees for the purpose of improving forage, browse, or cover for wildlife on areas that have been degraded beyond recovery via ecological principles, or old crop fields and pastures devoid of desirable, native rangeland species that range within an ecological site description steady state.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 550 - Range Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 550 - Range Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $9,746.04

**Scenario Cost/Unit:** $97.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Six Species Mix, Native Forb | 2334 | Native forb mix. Includes material and shipping only. | Acre | $952.01 | 10 | $9,520.10 |

**Practice:** E554118Z1 - Installation of end of pipe or ditch treatment for phosphorus

**Scenario** #1 - Installation of treatment for P

**Scenario Description:**
Add end of pipe treatment. If dissolved Phosphorus is the pollutant of concern, add Interim standard 782, Phosphorus Treatment Structure for each pipe outlet in a field.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 554 - Drainage Water Management

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 554 - Drainage Water Management

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,685.62

**Scenario Cost/Unit:** $7,685.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $436.99 | 6 | $2,621.94 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 40 | $92.40 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 40 | $143.60 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $61.59 | 16 | $985.44 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $28.49 | 20 | $569.80 |
| Pipe, PVC, 4", SDR 41 | 983 | Materials: - 4" - PVC - SDR 41 100 psi - ASTM D2241 | Foot | $1.97 | 80 | $157.60 |
| Tank, Poly enclosed Storage, 300-1000 gal | 1074 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.92 | 0 | $0.00 |
| Aggregate, gravel, washed, pea gravel | 1331 | Washed and graded pea gravel river stone. Includes materials and local delivery within 20 miles of quarry. | Cubic Yard | $31.41 | 20 | $628.20 |
| Water Control Structure, Stoplog, Inline, fixed costs portion | 2145 | Fixed cost portion of Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Fixed cost portion. Materials only. | Each | $318.35 | 1 | $318.35 |
| Water Control Structure, Stoplog, Inline, variable cost portion | 2146 | Variable cost portion of a Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Calculate total variable costs by multiplying by the structure height x pipe diameter. Materials only. | Height x Diameter | $12.30 | 36 | $442.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |
| Aggregate, Shipping, Cubic Yard-mile | 2360 | Mobilization of aggregate material beyond 20 miles of local delivery from quarry to construction site. Cubic Yard-mile (Cubic Yard * miles of haul). | Cubic Yard Mile | $0.34 | 400 | $136.00 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E554118Z2 - Installation of a saturated buffer drain outlet

**Scenario** #1 - Installation of a vegetated outlet

**Scenario Description:**

Install Conservation Practice Standard 604, Saturated Buffer so all of the drain outlets on a field are routed through an appropriate buffer.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 554 - Drainage Water Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 554 - Drainage Water Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,685.98

**Scenario Cost/Unit:** $3,685.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.36 | 400 | $544.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $55.03 | 4 | $220.12 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 4 | $113.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 4 | $108.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 4 | $189.00 |
| **Materials** | | | | | | |
| Pipe, HDPE, 5", PCPT, Single Wall | 1271 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 5" diameter - ASTM F405. Material cost only. | Foot | $0.73 | 400 | $292.00 |
| Water Level Control Structure, Inline, 2 Baffle, 10" diameter | 2021 | Inline Inlet WCS 6' High x 10" Dia.connections , 2 baffle (3 compartments) | Each | $1,969.49 | 1 | $1,969.49 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E554118Z3 - Installation of end of pipe or ditch treatment for nitrogen

**Scenario** #1 - Installation of treatment for N

**Scenario Description:**

Add end of pipe/ditch treatment if Nitrogen is the pollutant of concern. Add CPS 605, Denitrifying Bioreactor for each drainage outlet in a field.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 554 - Drainage Water Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 554 - Drainage Water Management

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $19,389.62

**Scenario Cost/Unit:** $19,389.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.55 | 800 | $2,040.00 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 333 | $769.23 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.59 | 333 | $1,195.47 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 8 | $350.24 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.87 | 366 | $8,370.42 |
| Trenching, Earth, 24" x 60" | 1460 | Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling. | Foot | $3.71 | 50 | $185.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| **Materials** | | | | | | |
| Pipe, HDPE, 6", CPT, Single Wall | 1242 | Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only. | Foot | $1.15 | 90 | $103.50 |
| Water Level Control Structure, Inline, 2 Baffle, 10" diameter | 2021 | Inline Inlet WCS 6' High x 10" Dia.connections , 2 baffle (3 compartments) | Each | $1,969.49 | 1 | $1,969.49 |
| Water Control Structure, Stoplog, Inline, fixed costs portion | 2145 | Fixed cost portion of Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Fixed cost portion. Materials only. | Each | $318.35 | 1 | $318.35 |
| Water Control Structure, Stoplog, Inline, variable cost portion | 2146 | Variable cost portion of a Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Calculate total variable costs by multiplying by the structure height x pipe diameter. Materials only. | Height x Diameter | $12.30 | 60 | $738.00 |
| Water Level Control Structure, Inline, 2 Baffle, 8" diameter | 2187 | Inline Inlet WCS 6' High x 8" Dia.connections , 2 baffle (3 compartments) | Each | $1,762.61 | 1 | $1,762.61 |
| Pipe, HDPE, CPT, Double Wall, Water Tight, 10" | 2204 | Pipe, Corrugated HDPE Double Wall 10" diameter with water tight joints meeting ASTM F477. Material cost only. | Foot | $6.23 | 40 | $249.20 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** E554138X - Extend the periods of soil saturation or shallow ponding for wildlife

**Scenario** #1 - Extend saturation/ponding period

**Scenario Description:**

Extending the periods of wetness (soil saturation or shallow water), in excess of those required under National Conservation Practice Standard (NCP) Drainage Water Management (554), to meet the additional consideration of wildlife.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 554 - Drainage Water Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 554 - Drainage Water Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 25.0

**Scenario Total Cost:** $244.77

**Scenario Cost/Unit:** $9.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 2 | $55.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 5 | $142.00 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 1 | $47.25 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E578139X - Stream crossing elimination

**Scenario** #1 - Stream crossing elimination

**Scenario Description:**
Existing stream crossings on an operation are consolidated into fewer crossings in order to reduce impacts to stream habitat.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 578 - Stream Crossing

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 578 - Stream Crossing

**Feature Measure:** Typical feature is 0.09 acres

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,952.79

**Scenario Cost/Unit:** $7,952.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $64.92 | 16 | $1,038.72 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $111.66 | 8 | $893.28 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $12.37 | 0.1 | $1.24 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $94.95 | 16 | $1,519.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 32 | $908.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 32 | $867.84 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 16 | $756.00 |
| **Materials** | | | | | | |
| Erosion Control Blanket, biodegradable | 1213 | Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only. | Square Yard | $1.32 | 300 | $396.00 |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.48 | 300 | $144.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $23.90 | 42 | $1,003.80 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $37.92 | 0.1 | $3.79 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.57 | 0.1 | $3.16 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** E580105Z - Stream corridor bank stability improvement

**Scenario** #1 - Stream bank stability improvement

**Scenario Description:**
Stream corridor bank vegetation components are established to provide additional streambank stability.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 580 - Streambank and Shoreline Protection

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 580 - Streambank and Shoreline Protection

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $4,054.48

**Scenario Cost/Unit:** $2,027.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.30 | 8 | $58.40 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 8 | $98.88 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.48 | 65 | $291.20 |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.50 | 65 | $292.50 |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.37 | 65 | $284.05 |
| Tree shelter, mesh tree tube, 48" | 1556 | 48" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $1.11 | 65 | $72.15 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 65 | $144.95 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.22 | 65 | $274.30 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.07 | 195 | $403.65 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E580137Z - Stream corridor bank vegetation improvement

**Scenario** #1 - Stream corridor bank veg improvement

**Scenario Description:**

Stream corridor bank vegetation components are established to improve ecosystem functioning and stability.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 580 - Streambank and Shoreline Protection

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 580 - Streambank and Shoreline Protection

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $4,054.48

**Scenario Cost/Unit:** $2,027.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 8 | $222.08 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.30 | 8 | $58.40 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 8 | $98.88 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 8 | $378.00 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.48 | 65 | $291.20 |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.50 | 65 | $292.50 |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.37 | 65 | $284.05 |
| Tree shelter, mesh tree tube, 48" | 1556 | 48" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $1.11 | 65 | $72.15 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.23 | 65 | $144.95 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.22 | 65 | $274.30 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.07 | 195 | $403.65 |

**Practice:** E590118X - Reduce risks of nutrient losses to surface water by utilizing precision ag technologies

**Scenario** #1 - Precision ag for nut reduction

**Scenario Description:**

Utilize precision application technology and techniques to reduce risk of nutrients in surface water by reducing total amount of applied and reducing the potential for delivery of nutrients into water bodies. Precision agriculture technology is utilized to plan and apply nutrients to improve nutrient use efficiency and reduce risk of nutrient losses.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 590 - Nutrient Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 590 - Nutrient Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,630.29

**Scenario Cost/Unit:** $16.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.47 | 100 | $1,047.00 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 35 | $357.35 |

**Practice:** E590118Z - Improving nutrient uptake efficiency and reducing risk of nutrient losses to surface water

**Scenario** #1 - Nut mgmt. for surface water

**Scenario Description:**

Nutrient management encompasses managing the amount, source, placement, and timing of the application of plant nutrients and soil amendments. Nutrients are currently being applied on the farm based on the 4R nutrient stewardship principles. Enhanced nutrient use efficiency strategies or technologies are utilized to improve nutrient use efficiency and reduce risk of nutrient losses.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 590 - Nutrient Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 590 - Nutrient Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,109.24

**Scenario Cost/Unit:** $11.09

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $8.19 | 100 | $819.00 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.86 | 5 | $64.30 |

**Practice:** E590119X - Reduce risks of nutrient losses to ground water by utilizing precision agriculture technologies to p

**Scenario** #10 - Prec Ag reduce nut in groundwater

**Scenario Description:**

Utilize precision application technology and techniques to reduce risk of nutrients in ground water by reducing total amount of applied and reducing the potential for delivery of nutrients into water bodies. Precision agriculture technology is utilized to plan and apply nutrients to improve nutrient use efficiency and reduce risk of nutrient losses.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 590 - Nutrient Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 590 - Nutrient Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,630.29

**Scenario Cost/Unit:** $16.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.47 | 100 | $1,047.00 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 35 | $357.35 |

**Practice:** E590119Z - Improving nutrient uptake efficiency and reducing risk of nutrient losses to groundwater

**Scenario** #1 - Nut mgmt. for groundwater

**Scenario Description:**

Nutrient management encompasses managing the amount, source, placement, and timing of the application of plant nutrients and soil amendments. Nutrients are currently being applied on the farm based on the 4R nutrient stewardship principles. Enhanced nutrient use efficiency strategies or technologies are utilized to improve nutrient use efficiency and reduce risk of nutrient losses.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 590 - Nutrient Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 590 - Nutrient Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,109.24

**Scenario Cost/Unit:** $11.09

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $8.19 | 100 | $819.00 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.86 | 5 | $64.30 |

**Practice:** E590130Z - Improving nutrient uptake efficiency and reducing risks to air quality - emissions of GHGs

**Scenario** #1 - Nut mgmt. for GHGs

**Scenario Description:**

Nutrient management encompasses managing the amount, source, placement, and timing of the application of plant nutrients and soil amendments. Nutrients are currently being applied on the farm based on the 4R nutrient stewardship principles. Enhanced nutrient use efficiency strategies or technologies are utilized to improve nutrient use efficiency and reduce risks to air quality by reducing emissions of Greenhouse Gases (GHGs).

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 590 - Nutrient Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 590 - Nutrient Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,109.24

**Scenario Cost/Unit:** $11.09

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $8.19 | 100 | $819.00 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.86 | 5 | $64.30 |

**Practice:** E595116X - Reduce risk of pesticides in surface water by utilizing precision pesticide application techniques

**Scenario** #1 - Pest mgmt. for surface water

**Scenario Description:**

Utilize precision application techniques to reduce risk of pesticides in surface water by reducing total amount of chemical applied and reducing the potential for delivery of chemicals into water bodies.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 595 - Integrated Pest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 595 - Integrated Pest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,305.91

**Scenario Cost/Unit:** $13.06

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, precision application | 949 | Chemical application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $9.67 | 100 | $967.00 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E595116Z - Reduce risk of pesticides in surface water by utilizing IPM PAMS techniques

**Scenario** #1 - IPM PAMS techniques

**Scenario Description:**

Utilize integrated pest management (IPM) prevent, avoidance, monitoring, and suppression (PAMS) techniques to reduce risk of pesticides in surface water and reducing the potential for delivery of chemicals into water bodies.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 595 - Integrated Pest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 595 - Integrated Pest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $729.51

**Scenario Cost/Unit:** $7.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E595116Z2 - Reducing routine neonicotinoid seed treatments on corn and soybean crops.

**Scenario** #10 - Reducing routine seed treatments

**Scenario Description:**

Eliminate routine use of neonicotinoid seed treatments to reduce risk of pesticides in surface water by reducing total amount of chemical applied and reducing the potential for delivery of chemicals into water bodies that would impair water quality and fish and wildlife habitat.

**Before Situation:**

Resources are protected at the minimum level established in the Conservation Practice Standard (CPS) 595 - Integrated Pest Management.

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in the Conservation Practice Standard (CPS) 595 - Integrated Pest Management.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $564.85

**Scenario Cost/Unit:** $5.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E595129Z - Reduce ozone precursor emissions related to pesticides by utilizing IPM PAMS techniques

**Scenario** #1 - IPM PAMS techniques for ozone reduction

**Scenario Description:**

Utilize integrated pest management (IPM) prevent, avoidance, monitoring, and suppression (PAMS) techniques to reduce ozone precursor emissions related to pesticides.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 595 - Integrated Pest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 595 - Integrated Pest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $729.51

**Scenario Cost/Unit:** $7.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 10 | $390.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 3 | $338.91 |

**Practice:** E612126Z - Cropland conversion to trees or shrubs for long term improvement of water quality

**Scenario** #1 - Convert crop to trees-WQ

**Scenario Description:**

Conversion of cropped land to trees for long term erosion control and improvement of water quality. Trees are established on cropland where annually-seeded cash crops have been grown

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $7,509.10

**Scenario Cost/Unit:** $750.91

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 10 | $209.70 |
| Ripper or subsoiler, 16 to 36 inch depth | 1235 | Deep ripper or subsoiler, (16-36 inches depth) includes tillage implement, power unit and labor. | Acre | $19.57 | 10 | $195.70 |
| **Materials** | | | | | | |
| Tree or shrub seedling, Tropical, native or non-native, 1 gal | 1543 | tree or shrub topical seedling, native or non-native, 1 gallon pot. Includes materials and shipping only. | Each | $13.73 | 500 | $6,865.00 |
| Four Species Mix, Cool Season, Introduced Perennial Grass | 2318 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $23.87 | 10 | $238.70 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E612130Z - Planting for high carbon sequestration rate

**Scenario** #1 - Planting for high carbon sequestration

**Scenario Description:**

Plant tree species and use stocking levels for higher growth to increase the rate of carbon sequestration (capture). Use species with a longer life span as well as relatively fast growth, and species suitable for durable manufactured products. Increase stocking levels in forests that are not fully stocked. Implement afforestation on appropriate open lands.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $10,691.92

**Scenario Cost/Unit:** $1,069.19

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 4 | $24.08 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 6 | $145.92 |
| Mechanical tree planter | 1600 | Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor. | Hour | $7.01 | 6 | $42.06 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 4 | $1,576.64 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 4 | $1,372.60 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 2 | $399.64 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 6 | $170.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 6 | $162.72 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 6 | $283.50 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 4 | $75.48 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 4 | $107.12 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 3 | $3.93 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 7260 | $6,025.80 |
| **Mobilization** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E612132Z - Establishing tree/shrub species to restore native plant communities

**Scenario** #1 - Tree/shrubs-restore native communities

**Scenario Description:**

Establish trees and/or shrubs to restore elements of plant diversity that have been lost through past diseases or improper management. For example, disease-resistant varieties of elm and chestnut can be established to restore the ecological functions of American elm and American chestnut. At the stand level, past forest management may have eliminated certain native tree species. Restoring stand-level diversity and function addresses a wide array of resource concerns and strengthens ongoing management activities. This enhancement improves a forest that is already in good condition by increasing plant diversity, and improving health and vigor through adding plants with resistance to disease, pests, or other local hazards. Additional benefits include contributing to carbon storage, and providing diversity in wildlife habitat and food sources.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $3,234.54

**Scenario Cost/Unit:** $646.91

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 12 | $148.32 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 12 | $340.80 |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage. | Hour | $74.41 | 4 | $297.64 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.48 | 50 | $224.00 |
| Tree, hardwood, seedling or transplant, potted or B&B, 2-3 gal. | 1532 | Potted or balled and burlapped hardwood tree, 2-3 gal. Includes materials and shipping only. | Each | $7.08 | 100 | $708.00 |
| Tree, conifer, seedling or transplant, potted or B&B, 2-3 gal. | 1537 | Potted or balled and burlapped conifer tree, 2-3 gal. Includes materials and shipping only. | Each | $6.90 | 100 | $690.00 |
| Tree shelter, solid tube type, 4" x 60" | 1567 | 4" x 60" tree tube for protection from animal damage. Materials only. | Each | $5.22 | 150 | $783.00 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E612133X1 - Adding food-producing trees and shrubs to existing plantings

**Scenario** #1 - Adding food-producing trees and shrubs

**Scenario Description:**

Plant food-producing trees and shrubs for wildlife or human consumption within windbreaks, alley cropping, multi-story cropping, or silvopasture systems, or riparian forest buffers.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,752.89

**Scenario Cost/Unit:** $175.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 10 | $277.60 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 10 | $123.60 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 1 | $26.78 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 341 | $190.96 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 340 | $282.20 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E612133X2 - Cultural plantings

**Scenario** #1 - Cultural plantings

**Scenario Description:**

Plant trees and shrubs that are of cultural significance, such as those species utilized by Tribes in traditional practices, medicinal, species used in basket-making, etc. (e.g., paper birch, slippery elm, witch hazel).

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,567.36

**Scenario Cost/Unit:** $1,567.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 10 | $123.60 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 10 | $284.00 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 1 | $26.78 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 681 | $565.23 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E612136Z - Tree/shrub planting for wildlife food

**Scenario** #1 - Tree/shrub planting for wildlife food

**Scenario Description:**

?Tree or shrub planting to enhance habitat for native wildlife. A minimum of five tree or shrub species will be used; they will be species that provide food and/or cover for identified wildlife species.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,394.96

**Scenario Cost/Unit:** $1,394.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 11 | $135.96 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 11 | $312.40 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 1 | $26.78 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 605 | $338.80 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 218 | $180.94 |

**Practice:** E612137Z - Tree/shrub planting for wildlife cover

**Scenario** #1 - Tree/shrub planting for wildlife cover

**Scenario Description:**

Tree or shrub planting to enhance habitat for native wildlife. A minimum of five tree or shrub species will be used; they will be species that provide food and/or cover for identified wildlife species.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,394.96

**Scenario Cost/Unit:** $1,394.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 1 | $6.02 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 11 | $135.96 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.36 | $123.53 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.23 | $45.96 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 11 | $312.40 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.87 | 1 | $18.87 |
| Herbicide, Sulfometuron & metsulfuron | 344 | A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $26.78 | 1 | $26.78 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 1 | $1.31 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.56 | 605 | $338.80 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.83 | 218 | $180.94 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E643132X - Restoration of sensitive coastal vegetative communities

**Scenario** #1 - Restore sensitive coastal veg community

**Scenario Description:**

?Enhance the level of restoration in unique and diminishing coastal ecosystems by establishing native herbaceous and woody plants. Protect established vegetation, and manage to maintain floristic quality and the provision of environmental services.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 643 - Restoration and Management of Rare and Declining Habitats

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 643 - Restoration and Management of Rare and Declining Habitats

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 25.0

**Scenario Total Cost:** $3,218.09

**Scenario Cost/Unit:** $128.72

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $43.78 | 8 | $350.24 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.36 | 8 | $98.88 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $47.25 | 2 | $94.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 7 | $790.79 |
| **Materials** | | | | | | |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.81 | 50 | $340.50 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 5 | $35.35 |
| Cattle Panel | 1409 | Welded wire cattle panel typically 1/4" galvanized steel rods, 50" high x 16' long. Materials only. | Each | $21.28 | 25 | $532.00 |
| Tree, hardwood, seedling or transplant, potted or B&B, 5 gal. | 1533 | Potted or balled and burlapped hardwood tree, 5 gal. Includes materials and shipping only. | Each | $14.56 | 25 | $364.00 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

## USDA - Natural Resources Conservation Service

**Washington**

**Practice:** E643139X - Creating native plant refugia

**Scenario** #1 - Creating native plant refugia

**Scenario Description:**

Provide protection from adverse environmental conditions to create refugia for documented occurrences of sensitive plant communities.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 643 - Restoration and Management of Rare and Declining Habitats

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 643 - Restoration and Management of Rare and Declining Habitats

**Feature Measure:** Feet of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 440.0

**Scenario Total Cost:** $3,513.34

**Scenario Cost/Unit:** $7.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.18 | 8 | $57.44 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 2 | $8.58 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 8 | $171.12 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.32 | 8 | $194.56 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 2 | $225.94 |
| **Materials** | | | | | | |
| Wire, Woven, Galvanized, 12.5 Gauge, 48" | 4 | Galvanized 12.5 gauge, 48" - 330' roll. Includes materials and shipping only. | Each | $261.88 | 3 | $785.64 |
| Post, Wood, CCA treated, 6" x 12-14' | 13 | Wood Post, Line/End 6" X 12-14', CCA Treated. Includes materials and shipping only. | Each | $27.48 | 38 | $1,044.24 |
| Fence, Wire Assembly, Woven Wire | 35 | Brace pins, twist sticks, staples. Includes materials and shipping only. | Foot | $0.12 | 1648 | $197.76 |
| Gate, Game, 8' High X 4' | 1082 | 4' Wide Game Gate (8' Tall). Includes materials and shipping only. | Each | $205.99 | 1 | $205.99 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E644136Z - Managing Flood-Irrigated Landscapes for Wildlife

**Scenario** #10 - Manage flood irrigated landscape for wildlife food

**Scenario Description:**

When flooded to shallow depths at the appropriate time of year, flood-irrigated cropland and pastureland provides foraging habitat for breeding and migratory waterfowl and waterbirds.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 644 – Wetland Wildlife Habitat Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 644 – Wetland Wildlife Habitat Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,382.16

**Scenario Cost/Unit:** $27.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 9 | $192.51 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 22 | $624.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E645137Z - Reduction of attractants to human-subsidized predators in sensitive wildlife species habitat

**Scenario** #1 - Reduce human-subsidized predators

**Scenario Description:**

Reduction of artificial perching sites, nest sites, food, and water available to subsidized predators in areas where human-subsidized predators are a threat to sensitive wildlife species. Human-subsidized predators may include ravens, crows, magpies, coyotes, foxes, skunks, raccoons, and other species. Activities under this enhancement may include removal of non- native or invasive trees; removal of unused power poles, corrals, windmills, buildings, and other vertical structures; and/or removal or management of watering facilities, dead livestock, road kill, garbage, animal feed, dumps, and other non-natural food sources.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 645 - Upland Wildlife Habitat Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 645 - Upland Wildlife Habitat Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $3,596.55

**Scenario Cost/Unit:** $89.91

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 72 | $1,540.08 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.30 | 72 | $525.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E646136Z1 - Close structures to capture/retain rainfall to improve food for waterfowl/wading birds during winter

**Scenario** #1 - Close structures to improve food

**Scenario Description:**

When flooded to shallow depths during fall and winter, agricultural fields provide ideal foraging habitat for myriad species of waterfowl and wading birds . In addition, flooded conditions promote establishment of aquatic invertebrate populations, thus providing protein-rich food sources for shorebirds as well as waterfowl and wading birds.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,509.56

**Scenario Cost/Unit:** $30.19

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 9 | $192.51 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2.5 | $127.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 22 | $624.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E646136Z2 - Extend retention of rainfall to provide food for late winter habitat

**Scenario** #1 - Extend retention - food

**Scenario Description:**

When flooded to shallow depths during fall and retention of the captured rainfall is extended into late winter, agricultural fields provide maximum foraging habitat for myriad species of waterfowl and wading birds. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide high quality food for wildlife during a time when it may otherwise be in low abundance.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,778.91

**Scenario Cost/Unit:** $35.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 11 | $235.29 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2.5 | $127.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 26 | $738.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 6 | $677.82 |

**Practice:** E646136Z3 - Shorebird habitat, late season shallow water with manipulation to improve food sources

**Scenario** #1 - Late season shallow water - food

**Scenario Description:**

Suitable shorebird habitat is limited during the summer and fall as birds migrate south post-breeding and providing shallow water and mud flat habitat will benefit a variety of shorebird species. Optimal conditions are created when water levels are slowly reduced through evaporation, which allows for propagation of invertebrates (typically insect larvae) used as food by shorebirds. Manipulation of vegetation, preferably through rolling, creates open conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,761.82

**Scenario Cost/Unit:** $55.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 9 | $192.51 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 4.5 | $229.32 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 50 | $815.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 22 | $624.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** E646136Z4 - Shorebird habitat, extended late season shallow water with manipulation to improve food sources

**Scenario** #1 - Extended late season shallow water-food

**Scenario Description:**

When flooded to shallow depths during fall and retention of the captured rainfall is extended into late winter, the shallow water and mud flat habitat will benefit a variety of shorebird species. Optimal conditions are created when water levels are slowly reduced through evaporation, which allows for propagation of invertebrates (typically insect larvae) used as food by shorebirds. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide high quality food for wildlife during a time when it may otherwise be in low abundance. Manipulation of vegetation, preferably through rolling, creates open conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $3,082.13

**Scenario Cost/Unit:** $61.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 11 | $235.29 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 5.5 | $280.28 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 50 | $815.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 26 | $738.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 6 | $677.82 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** E646137X - Renovate small, shallow pothole and playa sites which may seasonally hold water

**Scenario** #1 - Shallow water development and management

**Scenario Description:**
Renovate small, shallow pothole and playa sites which may seasonally hold water.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $6,908.91

**Scenario Cost/Unit:** $1,727.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.31 | 1613 | $3,726.03 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 4 | $24.08 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $20.97 | 3 | $62.91 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $394.16 | 0.41 | $161.61 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $343.15 | 0.23 | $78.92 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $199.82 | 0.36 | $71.94 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 4 | $151.32 |
| Six Species Mix, Native Forb | 2334 | Native forb mix. Includes material and shipping only. | Acre | $952.01 | 2 | $1,904.02 |
| Native Grass and Forb Mix, for Wildlife (including pollinators) or Ecosystem Restoration | 2335 | Native grass and forb/legume mix, including specialized species. Includes material and shipping only. | Acre | $252.12 | 1 | $252.12 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $475.96 | 1 | $475.96 |

**Practice:** E646137Z1 - Close structures to capture and retain rainfall to improve cover and shelter for birds during winter

**Scenario** #1 - Close structures during winter.

**Scenario Description:**
When flooded to shallow depths during fall and winter, agricultural fields provide ideal cover and shelter for myriad species of waterfowl and wading birds.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,509.56

**Scenario Cost/Unit:** $30.19

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 9 | $192.51 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2.5 | $127.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 22 | $624.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E646137Z2 - Extend retention of captured rainfall to provide enhanced cover and shelter for late winter habitat

**Scenario** #1 - Extend retention-cover and shelter

**Scenario Description:**

When flooded to shallow depths during the fall and retained into late winter, agricultural fields provide maximum shelter and cover for myriad species of waterfowl and wading birds. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide shelter and cover for waterfowl and shorebirds during a time when it may otherwise be in low abundance.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,778.91

**Scenario Cost/Unit:** $35.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 11 | $235.29 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2.5 | $127.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 26 | $738.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 6 | $677.82 |

**Practice:** E646137Z3 - Shorebird habitat, late season shallow water with manipulation to improve cover and shelter

**Scenario** #1 - Late season shallow water - cover

**Scenario Description:**

Suitable shorebird habitat is limited during the summer and fall as birds migrate south post-breeding. Providing shallow water and mud flat habitat will benefit a variety of shorebird species. Improved conditions are created when water levels are slowly reduced through evaporation, which allows for propagation of invertebrates (typically insect larvae) used as food by shorebirds. Manipulation of vegetation, preferably through rolling, creates open conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,761.82

**Scenario Cost/Unit:** $55.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 9 | $192.51 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 4.5 | $229.32 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 50 | $815.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 22 | $624.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** E646137Z4 - Extended late season shallow water with manipulation to improve cover and shelter

**Scenario** #1 - Extended late season shallow water-cover

**Scenario Description:**

Suitable shorebird habitat is limited during the summer and fall as birds migrate south post-breeding. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide shelter and cover for waterfowl and shorebirds during a time when it may otherwise be in low abundance. Optimal conditions are created when water levels are slowly reduced and manipulation of vegetation, preferably through rolling, creates open conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $3,082.13

**Scenario Cost/Unit:** $61.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 11 | $235.29 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 5.5 | $280.28 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 50 | $815.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 26 | $738.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 6 | $677.82 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** E646138Z1 - Close structures to capture and retain rainfall to provide water for birds during winter

**Scenario** #1 - Close structures to provide water

**Scenario Description:**
When flooded to shallow depths during fall and winter, agricultural fields provide water essential for myriad species of waterfowl and wading birds.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,509.56

**Scenario Cost/Unit:** $30.19

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 9 | $192.51 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2.5 | $127.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 22 | $624.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E646138Z2 - Extend retention of captured rainfall to provide late winter water habitat

**Scenario** #1 - Extend winter water habitat

**Scenario Description:**

When flooded to shallow depths during fall and winter, agricultural fields provide water essential for myriad species of waterfowl and wading birds. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide water for shorebirds and waterfowl during a time when it may otherwise be in low abundance.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,778.91

**Scenario Cost/Unit:** $35.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 11 | $235.29 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2.5 | $127.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 26 | $738.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 6 | $677.82 |

**Practice:** E646138Z3 - Shorebird habitat, late season shallow water with manipulation

**Scenario** #1 - Late season shallow water

**Scenario Description:**

Suitable water is limited during the summer and fall as birds migrate south post-breeding. Providing shallow water and mud flat habitat will benefit a variety of shorebird species. Improved conditions are created when water levels are slowly reduced through evaporation. Manipulation of vegetation, preferably through rolling, creates open water conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,761.82

**Scenario Cost/Unit:** $55.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 9 | $192.51 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 4.5 | $229.32 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 50 | $815.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 22 | $624.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** E646138Z4 - Shorebird habitat, extended late season shallow water with manipulation

**Scenario** #1 - Extended late season shallow water

**Scenario Description:**

Suitable water is limited during the summer and fall as birds migrate south post-breeding. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide habitat during a time when it may otherwise be in low abundance. Optimal conditions are created when water levels are slowly reduced and manipulation of vegetation, preferably through rolling, creates open water conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $3,082.13

**Scenario Cost/Unit:** $61.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 11 | $235.29 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 5.5 | $280.28 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 50 | $815.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 26 | $738.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 6 | $677.82 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** E646139Z1 - Close structures to capture and retain rainfall for birds to improve habitat continuity

**Scenario** #1 - Close structures - habitat continuity

**Scenario Description:**

When flooded to shallow depths during fall and winter, agricultural fields provide habitat for myriad species of migratory birds. Those flooded conditions promote a network or continuity of habitat that is available to migratory waterfowl, shorebirds, and wading birds.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,509.56

**Scenario Cost/Unit:** $30.19

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 9 | $192.51 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2.5 | $127.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 22 | $624.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |

**Practice:** E646139Z2 - Extend retention of captured rainfall to provide habitat continuity during late winter

**Scenario** #1 - Extend retention - habitat continuity

**Scenario Description:**

When flooded to shallow depths during the fall and retained into late winter, agricultural fields provide habitat for myriad species of migratory birds. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide a network or continuity of habitat for waterfowl, wading birds, and shorebirds during a time when it may otherwise be in low abundance.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,778.91

**Scenario Cost/Unit:** $35.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 11 | $235.29 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 2.5 | $127.40 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 26 | $738.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 6 | $677.82 |

**Practice:** E646139Z3 - Shorebird habitat, late season shallow water with manipulation to enhance habitat continuity

**Scenario** #1 - Late season shallow water-continuity

**Scenario Description:**

Suitable water is limited during the summer and fall as birds migrate south post-breeding. Providing shallow water and mud flat habitat will benefit a variety of shorebird species. Improved conditions are created when water levels are slowly reduced through evaporation. Manipulation of vegetation, preferably through rolling, creates open water conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,761.82

**Scenario Cost/Unit:** $55.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 9 | $192.51 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 4.5 | $229.32 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 50 | $815.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 22 | $624.80 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 5 | $564.85 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** E646139Z4 - Shorebird habitat, extended late season shallow water with manipulation - habitat continuity

**Scenario** #1 - Extended late season water-continuity

**Scenario Description:**

Suitable water is limited during the summer and fall as birds migrate south post-breeding. Providing shallow water with manipulation of vegetation creates a network or continuity of habitat required by this suite of migratory birds during a time when it may otherwise be in low abundance.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $3,082.13

**Scenario Cost/Unit:** $61.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 11 | $235.29 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 5.5 | $280.28 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.30 | 50 | $815.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 26 | $738.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 6 | $677.82 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** E647136Z1 - Manipulate vegetation on fields where rainfall is to be captured and retained-food

**Scenario** #1 - Manipulate veg for food

**Scenario Description:**

Harvested and idled agricultural lands, notably those occurring within rice rotations, contain high densities of residual (i.e., waste) grain and natural seeds following harvest. Seed densities in harvested rice fields may rival those documented in intensively managed moist-soil units. When flooded to shallow depths during fall and winter, these agricultural fields provide ideal foraging habitat for myriad species of waterfowl and wading birds. In addition, flooded conditions promote establishment of aquatic invertebrate populations, thus providing protein-rich food sources for shorebirds as well as waterfowl and wading birds. In many cases, light manipulation of dense vegetation is needed to improve the accessibility of food resources to waterfowl, wading birds, and shorebirds.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,168.66

**Scenario Cost/Unit:** $23.37

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 8 | $453.12 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** E647136Z3 - Establish and maintenance of moist soil vegetation on cropland edges to increase wildlife food

**Scenario** #1 - Moist soil vegetation-food

**Scenario Description:**

The wetter or more water saturated portions of cropland fields such as areas adjacent to field drains, have the potential to produce a significant amount of moist soil plants which are a tremendously valuable source of forage and cover for many waterfowl, shorebird and wading bird species, especially during a period of time when such plants may be limited. Under normal cropland production, the native vegetation is restricted on these sites through mechanical and/or chemical control. These maintained moist soil plants also will provide filtering and improve water quality.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $569.58

**Scenario Cost/Unit:** $11.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 3 | $152.88 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 3 | $81.36 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** E647137Z1 - Manipulate vegetation on fields where rainfall is to be captured and retained-cover/shelter

**Scenario** #1 - Manipulate veg for cover/shelter

**Scenario Description:**

This enhancement is to provide cover and shelter for wildlife by retaining some standing rice stubble and by encouraging the establishment of early successional, naturally occurring vegetation in fields post harvest. Allowing some standing rice stubble and naturally occurring vegetation to develop will help provide food and cover for wildlife while enhancing aquatic habitat and improving water quality.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,168.66

**Scenario Cost/Unit:** $23.37

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $56.64 | 8 | $453.12 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 2 | $498.58 |

**Practice:** E647137Z2 - Establish and maintenance of moist soil vegetation on cropland edges to increase cover/shelter

**Scenario** #1 - Moist soil vegetation-cover/shelter

**Scenario Description:**

The wetter or more water saturated portions of cropland fields such as areas adjacent to field drains, have the potential to produce a significant amount of moist soil plants which are a tremendously valuable source of forage and cover for many waterfowl, shorebird and wading bird species, especially during a period of time when such plants may be limited. Under normal cropland production, the native vegetation is restricted on these sites through mechanical and/or chemical control. These maintained moist soil plants also will provide filtering and improve water quality.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $569.58

**Scenario Cost/Unit:** $11.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 3 | $152.88 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 3 | $81.36 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** E647139Z1 - Establish/maintain habitat continuity, naturally occurring vegetation in ditches/ditch bank borders

**Scenario** #1 - Naturally occurring veg in ditches

**Scenario Description:**

This enhancement is to encourage the establishment of early successional, naturally occurring vegetation in ditches, side slope and bank borders to provide cover, critical nesting and brood rearing habitat as well as filtering overland flow and improving water quality. Ditches perform the critical function of removing water from agricultural lands. Allowing naturally occurring vegetation to develop along ditches, including side slopes, banks and borders, will help provide food and cover for wildlife while enhancing aquatic habitat and improving water quality. Ditches and ditch borders provide a foundation that supports a diverse wildlife community including Northern Bobwhite (Colinus virginianus) and other birds preferring early successional cover. Rabbits, furbearers, amphibians and many other species that inhabit agriculture areas will use this vegetative cover. These areas can also provide critical nesting habitat for the Mottled Duck (Anas fulvigula).

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $569.58

**Scenario Cost/Unit:** $11.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $50.96 | 3 | $152.88 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 3 | $81.36 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 2 | $335.34 |

**Practice:** E666106Z2 - Maintaining and improving forest soil quality

**Scenario** #1 - Maintain/improve forest SQ

**Scenario Description:**

?Adopts guidelines for maintaining and improving soil quality on sites where forest management activities are practiced. These guidelines will increase soil organic matter content, improve nutrient cycling, and increase infiltration and retention of precipitation. Avoiding soil compaction will allow for greater root development and tree growth, limit windthrow, and reduce drought stress. Increasing carbon storage on site will maintain the soil microbial community and provide wildlife benefits.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,245.11

**Scenario Cost/Unit:** $44.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 4 | $17.16 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 4 | $111.04 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 13 | $1,468.61 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 10 | $102.10 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 5 | $35.35 |
| Certified Organic, Three plus Species Mix, Cool Season, Annual Grasses and Legumes | 2343 | Certified organic cool season annual grass and legume mix. Includes material and shipping only. | Acre | $80.29 | 3 | $240.87 |

**Practice:** E666107Z - Maintaining and improving forest soil quality by limiting compaction

**Scenario** #1 - Maintain/improve forest compaction

**Scenario Description:**

?Adopts guidelines for maintaining and improving soil quality on sites where forest management activities are practiced. These guidelines will increase soil organic matter content, improve nutrient cycling, and increase infiltration and retention of precipitation. Avoiding soil compaction will allow for greater root development and tree growth, limit windthrow, and reduce drought stress. Increasing carbon storage on site will maintain the soil microbial community and provide wildlife benefits.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,245.11

**Scenario Cost/Unit:** $44.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 4 | $17.16 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 4 | $111.04 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 13 | $1,468.61 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.21 | 10 | $102.10 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 5 | $35.35 |
| Certified Organic, Three plus Species Mix, Cool Season, Annual Grasses and Legumes | 2343 | Certified organic cool season annual grass and legume mix. Includes material and shipping only. | Acre | $80.29 | 3 | $240.87 |

**Practice:** E666115Z2 - Enhance development of the forest understory to improve site moisture

**Scenario** #1 - Forest understory to improve moisture

**Scenario Description:**

?Forest stand improvement to manage the structure and composition of overstory and understory vegetation so that additional moisture is captured and filtered through the vegetation and soil. Managing the understory vegetation will increase available water to the plants, minimize run-off and erosion, and improve water quality.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $5,005.50

**Scenario Cost/Unit:** $250.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 16 | $1,385.28 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 16 | $1,019.36 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 11 | $1,242.67 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 20 | $756.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E666118Z - Enhance development of the forest understory to capture nutrients in surface water

**Scenario** #1 - Understory-nutrients in surface water

**Scenario Description:**

?Forest stand improvement to manage the structure and composition of overstory and understory vegetation so that additional moisture is captured and filtered through the vegetation and soil, thus minimizing nutrient movement in surface water. Managing the understory vegetation will increase available water to the plants, minimize run-off and erosion, and improve water quality.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $5,005.50

**Scenario Cost/Unit:** $250.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 16 | $1,385.28 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 16 | $1,019.36 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 11 | $1,242.67 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 20 | $756.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E666119Z - Enhance development of the forest understory to capture nutrients -ground water

**Scenario** #1 - Understory-nutrients in ground water

**Scenario Description:**

?Forest stand improvement to manage the structure and composition of overstory and understory vegetation so that additional moisture is captured and filtered through the vegetation and soil, thus minimizing nutrient loss through ground water. Managing the understory vegetation will increase available water to the plants, minimize run-off and erosion, and improve water quality.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $5,005.50

**Scenario Cost/Unit:** $250.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 16 | $1,385.28 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 16 | $1,019.36 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 11 | $1,242.67 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 20 | $756.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E666130Z - Increase on-site carbon storage

**Scenario** #1 - Increase on-site carbon storage

**Scenario Description:**

Utilize forest management techniques to increase on-site carbon storage, including uneven-aged management, longer rotations, leave-tree retention, snags and down woody debris, and soil organic matter.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,468.61

**Scenario Cost/Unit:** $14.69

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 13 | $1,468.61 |

**Practice:** E666132Z1 - Crop tree management for mast production

**Scenario** #1 - Crop tree management for mast production

**Scenario Description:**
Forest stand improvement using crop tree management techniques to increase mast production

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,702.60

**Scenario Cost/Unit:** $370.26

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 25 | $107.25 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 25 | $1,592.75 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 25 | $710.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 10 | $70.70 |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.98 | 10 | $189.80 |

**Practice:** E666132Z2 - Reduce forest stand density to improve a degraded plant community

**Scenario** #1 - Forest density-degraded plant community

**Scenario Description:**

?Open pine or conifer management reduces the number of trees per acre while still maintaining the stand as forest land. It restores elements of stand structure that were formerly created by fire on sites where it is not currently feasible to conduct prescribed burning at the intensity needed to open the canopy. The open stand condition allows a significant amount of sunlight to reach the forest floor and stimulate understory vegetation. The initial treatment creates a stand structure that allows prescribed burning to be applied to limit redevelopment of the woody component of the understory and maintain open conditions. The vegetation management, and wide spacing between trees or clumps of trees, provides visual appeal, reduces the risk of wildfire, and provides wildlife habitat for many at-risk and listed wildlife species.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $5,715.14

**Scenario Cost/Unit:** $285.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 20 | $1,731.60 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 20 | $1,274.20 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 20 | $542.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 11 | $1,242.67 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 20 | $756.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E666133X - Forest Stand Improvement to rehabilitate degraded hardwood stands

**Scenario** #1 - FSI-structure/composition in hardwoods

**Scenario Description:**

?Mixed species hardwood stands have been subjected to poor logging practices (“high-grading”) for decades. Without professional forestry assistance the best species and individual trees are removed, often before maturity (“diameter-limit cutting”), leaving the poorest species and individual trees to regenerate the stand. Reversing this process requires cutting or killing poor quality trees while retaining any desirable species that might still be present. A combination of 3 silvicultural methods are applied: crop tree release, group selection (all trees removed from an area 0.25 to 1.0 acre in size) and small clear-cuts (all trees removed from an area 1-3 acres in size). A professional forester is needed to recognize and mark crop trees to be retained and delineate areas without crop trees to be clear-cut. Thinning and forest stand improvement will include cutting with hand tools (chainsaws) and injection. Costs involved in any commercial harvesting including marking, access, and transportation are not included in this scenario. However the costs involved in marking trees to be treated or left and supervising the TSI work is included.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,137.91

**Scenario Cost/Unit:** $513.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 16 | $68.64 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 40 | $2,548.40 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 16 | $444.16 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 16 | $454.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 10 | $70.70 |
| Herbicide, Triazine | 1321 | Broad spectrum herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $43.74 | 10 | $437.40 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E666133Z1 - Creating structural diversity with patch openings

**Scenario** #1 - Structural diversity with patch openings

**Scenario Description:**

Forest stand improvement that creates patch openings. Size and shape of patches will be based on characteristic natural wind disturbances, which will vary geographically and by forest type.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $8,613.45

**Scenario Cost/Unit:** $574.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 150 | $643.50 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 15 | $320.85 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 150 | $4,260.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 30 | $3,389.10 |

**Practice:** E666133Z2 - Converting loblolly and slash pine plantations to longleaf pine with FSI and prescribed burning

**Scenario** #1 - Convert to longleaf pine-FSI and burning

**Scenario Description:**

Longleaf pine has greater wildlife habitat value, is more resistant to insects and disease, and is better able to withstand hurricane-force winds than other southern pines, particularly loblolly and slash pines. Because of rapid early growth, loblolly and slash pines have often been planted on soils and sites better suited to longleaf. Loblolly and slash pine plantations can be converted to longleaf by clearcutting and planting seedlings but mature tree cover is then lost for 20 or more years. This enhancement will gradually convert an existing loblolly or slash pine plantation to longleaf while at the same time maintaining mature tree cover with the associated benefits of wildlife habitat and visual quality, and moderating effects on soil temperature, soil moisture and understory plants.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $6,665.08

**Scenario Cost/Unit:** $133.30

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 14 | $299.46 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.02 | 10 | $60.20 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $27.76 | 2 | $55.52 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 16 | $624.96 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 48 | $1,363.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 18 | $2,033.46 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 10 | $70.70 |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 10 | $378.30 |
| Herbicide, Surfactant | 1095 | Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $1.31 | 10 | $13.10 |
| Tree, conifer, seedling, containerized, 4 cu. in. | 1516 | Containerized conifer stock, 4 cubic inches (e.g., "4a" plug), 1.1" x 5.2". Includes materials and shipping only. | Each | $0.25 | 6050 | $1,512.50 |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.39 | 1 | $4.39 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $249.29 | 1 | $249.29 |

**Practice:** E666134Z - Enhance development of the forest understory to create conditions resistant to pests

**Scenario** #1 - Forest understory-resistant to pests

**Scenario Description:**

?Forest stand improvement that manages the structure and composition of overstory and understory vegetation to reduce vulnerability to damage by insects and diseases of forest trees. Managing the understory vegetation will also reduce the risk of wildfire, and promote development of herbaceous plants that benefit wildlife.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $5,005.50

**Scenario Cost/Unit:** $250.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 16 | $1,385.28 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 16 | $1,019.36 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 11 | $1,242.67 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 20 | $756.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E666135Z1 - Reduce height of the forest understory to limit wildfire risk

**Scenario** #1 - Forest understory-limit wildfire risk

**Scenario Description:**

?Forest stand improvement that manages forest structure to reduce the risk of wildfire, and creates conditions that facilitate prescribed burning. The fire risk reduction is accomplished by reducing the height of the woody understory and midstory, creating space between the ground cover and the tree canopy.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $5,005.50

**Scenario Cost/Unit:** $250.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 16 | $1,385.28 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 16 | $1,019.36 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 11 | $1,242.67 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 20 | $756.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E666135Z2 - Reduce forest density and manage understory along roads to limit wildfire risk

**Scenario** #1 - Manage understory-limit wildfire risk

**Scenario Description:**

Opening the tree canopy along roads ("daylighting"), and providing space between ground vegetation and tree crowns, minimizes the spread of wildfires that often start along roads. Additionally, opening the canopy will allow more sunlight to reach the forest floor and promote flowering plants, and will reduce maintenance needs by allowing moisture to evaporate from roads.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,962.86

**Scenario Cost/Unit:** $296.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 8 | $34.32 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 8 | $692.64 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 8 | $509.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 10 | $378.30 |

**Practice:** E666136Z1 - Reduce forest density and manage understory along roads to improve wildlife food sources

**Scenario** #1 - Manage understory-wildlife food sources

**Scenario Description:**

Opening the tree canopy along roads ("daylighting") allows more sunlight to reach the forest floor and promotes the growth of herbaceous plants. The resulting condition is more visually appealing for users of the roadway, and improves wildlife habitat and food sources for many wildlife species.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,962.86

**Scenario Cost/Unit:** $296.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 8 | $34.32 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 8 | $692.64 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 8 | $509.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 8 | $227.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 8 | $216.96 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 8 | $903.76 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 10 | $378.30 |

**Practice:** E666136Z2 - Reduce forest stand density to improve wildlife food sources

**Scenario** #1 - Stand density-wildlife food sources

**Scenario Description:**

?Open pine or conifer management reduces the number of trees per acre while still maintaining the stand as forest land. It restores elements of wildlife habitat that formerly resulted from fire, on sites where it is not currently feasible to conduct prescribed burning. The open stand condition allows a significant amount of sunlight to reach the forest floor and stimulate understory vegetation. The initial treatment creates a stand structure that allows prescribed burning to be applied, where feasible, to limit redevelopment of the woody component of the understory and maintain open conditions. The vegetation management, and wide spacing between trees or clumps of trees, provides visual appeal, reduces the risk of wildfire, and provides wildlife habitat for many at-risk and listed wildlife species.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $5,715.14

**Scenario Cost/Unit:** $285.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 20 | $1,731.60 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 20 | $1,274.20 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 20 | $542.40 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 11 | $1,242.67 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 20 | $756.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |

**Practice:** E666136Z3 - Create patch openings to enhance wildlife food sources and availability

**Scenario** #1 - Patch openings-food and availability

**Scenario Description:**

?Forest stand improvement that creates patch openings. Size, shape, and arrangement of patches will be based on natural features, and emulate patches that would result from natural disturbance regimes of wind or fire, varying geographically and by forest type. The treatment will create diversity in stand composition and structure, and enhance wildlife food availability.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $5,422.15

**Scenario Cost/Unit:** $361.48

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 120 | $514.80 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 12 | $256.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 120 | $3,408.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 11 | $1,242.67 |

**Practice:** E666137Z1 - Snags, den trees, and coarse woody debris for wildlife habitat

**Scenario** #1 - Snags and den trees for wildlife

**Scenario Description:**
Create and retain snags, den trees, forest stand structural diversity, and coarse woody debris on the forest floor to provide cover/shelter for native wildlife species.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $534.95

**Scenario Cost/Unit:** $53.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 7 | $30.03 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 1 | $21.39 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 3 | $191.13 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $39.06 | 7 | $273.42 |
| **Materials** | | | | | | |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.98 | 1 | $18.98 |

**Practice:** E666137Z2 - Summer roosting habitat for native forest-dwelling bat species

**Scenario** #1 - Summer roosting habitat for bats

**Scenario Description:**
Creates new potential roost trees within upland and riparian forests to achieve desired summer habitat for forest dwelling bat species.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,093.92

**Scenario Cost/Unit:** $209.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 13 | $55.77 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 6 | $128.34 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 13 | $828.23 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 13 | $369.20 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $7.07 | 10 | $70.70 |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.98 | 10 | $189.80 |

**Practice:** E666137Z3 - Increase diversity in pine plantation monocultures

**Scenario** #1 - Improve pine plantation diversity

**Scenario Description:**

Creates small openings to provide diversity in pine plantations, which are typically monocultures and inhospitable to wildlife. Small openings are one-half (0.5) to three (3) acres in size. The cleared area will have the vegetation removed through harvesting, mulching, or other means compatible with the site.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $1,148.46

**Scenario Cost/Unit:** $574.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 20 | $85.80 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 2 | $42.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 20 | $568.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 4 | $451.88 |

**Practice:** E666137Z6 - Create patch openings to enhance wildlife cover and shelter

**Scenario** #1 - Patch openings-cover and shelter

**Scenario Description:**

?Forest stand improvement that creates patch openings. Size, shape, and arrangement of patches will be based on natural features, and emulate patches that would result from natural disturbance regimes of wind or fire, varying geographically and by forest type. The treatment will create diversity in stand composition and structure, and enhance the availability of wildlife food and cover.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $5,422.15

**Scenario Cost/Unit:** $361.48

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.29 | 120 | $514.80 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.39 | 12 | $256.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $28.40 | 120 | $3,408.00 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 11 | $1,242.67 |

**Practice:** E666137Z7 - Enhance development of the forest understory to provide wildlife cover and shelter

**Scenario** #1 - Understory to provide cover/shelter

**Scenario Description:**

?Forest stand improvement that manages the structure and composition of overstory and understory vegetation to improve the quantity and quality of wildlife cover and shelter. Reducing the number of trees per acre provides canopy openings that allow sunlight to reach the forest floor and promote the growth of herbaceous plants, improving wildlife shelter and cover in the forest understory. The treatment also creates conditions that facilitate the use of prescribed burning as a follow-up practice to maintain wildlife shelter and cover.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $5,005.50

**Scenario Cost/Unit:** $250.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $86.58 | 16 | $1,385.28 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $63.71 | 16 | $1,019.36 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $27.12 | 16 | $433.92 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $112.97 | 11 | $1,242.67 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.83 | 20 | $756.60 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $167.67 | 1 | $167.67 |