

Practice: 603 - Herbaceous Wind Barriers

Scenario: #1 - Perennial species

Scenario Description:

Perennial warm season grass herbaceous barriers are installed to reduce wind velocities and wind-borne particulate matter. 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. Associated practices include, but not limited to (590) Nutrient Management, and (645) Upland Wildlife Habitat Management.

Before Situation:

Typically cropland has excessive soil disturbance and unsheltered distance that results in excessive wind erosion that affects soil and air resources. Seedling development and wildlife habitat are negatively affected by wind-borne sediment and sediment-borne contaminants travelling offsite. The wind-borne sediment is also negatively affecting air quality through the generation of particulate matter.

After Situation:

Typical installation is on a 40 acre field, with 6 foot wide strips seeded every 60 feet resulting in 27,720 linear feet of seeded strips, or 3.8 acres seeded. Implementation of perennial herbaceous wind barriers will modify the flow and velocity of air dependant 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, improve air quality by reducing particulate matter, and provide food and cover for wildlife. Payment is for the design and implementation of perennial barriers.

Scenario Feature Measure: linear feet of barrier planted

Scenario Unit: Linear Foot

Scenario Typical Size: 27,720

Scenario Cost: \$2,383.33

Scenario Cost/Unit: \$0.09

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.22	4	\$144.88
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.27	7.6	\$78.05
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$19.69	3.8	\$74.82
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	1.9	\$817.82
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	1.9	\$831.74
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	8	\$166.48
Materials						
One Species, Warm Season, Native Perennial Grass	2322	Native, warm season perennial grass. Includes material and shipping only.	Acre	\$70.93	3.8	\$269.53

Practice: 606 - Subsurface Drain

Scenario: #1 - ≤ 5in CPP

Scenario Description:

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline, using a trencher. Scenario describes the construction 2,000 feet of 5-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth of 5 feet. Subsurface drainage is installed as a supporting practice for a number of associated conservation practices.

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; 620 - Underground Outlet; 412 - Grassed Waterway; 638 - Water and Sediment Control Basin; 342 - Critical Area Planting; 484 - Mulching; 410 - Grade Stabilization Structure; 468 - Lined Waterway or Outlet; 313 Waste Storage Facility

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.). Conservation practice implementation including (but not limited to) grassed waterways have a high failure rate due to the prolonged wetness that prohibits plant germination and/or drowns new growth.

After Situation:

The drainage modifications result in reduced water in the upper horizons of the soil profile, allowing for sufficient aeration to allow vegetation to establish. Gully erosion and sediment transport are minimized by established vegetation, a direct result of removing excess water from the soil profile. Plant stress due to excessive wetness caused by a seasonal high water table is minimized, and drainage water quality is improved due to increased erosion control.

Scenario Feature Measure: length of pipe

Scenario Unit: Foot

Scenario Typical Size: 2,000

Scenario Cost: \$4,289.15

Scenario Cost/Unit: \$2.14

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	2000	\$2,660.00
Materials						
Pipe, HDPE, 5", PCPT, Single Wall	1271	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 5" diameter - ASTM F405. Material cost only.	Foot	\$0.69	2000	\$1,380.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 606 - Subsurface Drain

Scenario: #2 - 6in CPP

Scenario Description:

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline, using a trencher. Scenario describes construction of 2,000 feet of 6-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth of 5 feet. Subsurface drainage is installed as a supporting practice for a number of associated conservation practices.

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; 620 - Underground Outlet; 412 - Grassed Waterway; 638 - Water and Sediment Control Basin; 342 - Critical Area Planting; 484 - Mulching; 410 - Grade Stabilization Structure; 468 - Lined Waterway or Outlet; 313 - Waste Storage Facility

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.). Conservation practice implementation including (but not limited to) grassed waterways have a high failure rate due to the prolonged wetness that prohibits plant germination and/or drowns new growth.

After Situation:

The drainage modifications result in reduced water in the upper horizons of the soil profile, allowing for sufficient aeration to allow vegetation to establish. Gully erosion and sediment transport are minimized by established vegetation, a direct result of removing excess water from the soil profile. Plant stress due to excessive wetness caused by a seasonal high water table is minimized, and drainage water quality is improved due to increased erosion control.

Scenario Feature Measure: length of pipe

Scenario Unit: Foot

Scenario Typical Size: 2,000

Scenario Cost: \$5,149.15

Scenario Cost/Unit: \$2.57

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	2000	\$2,660.00
Materials						
Pipe, HDPE, 6", CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only.	Foot	\$1.12	2000	\$2,240.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 606 - Subsurface Drain

Scenario: #3 - 8in CPP

Scenario Description:

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline, using a trencher. Scenario describes the construction 2,000 feet of 8-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth of 5 feet. Subsurface drainage is installed as a supporting practice for a number of associated conservation practices.

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; 620 - Underground Outlet; 412 - Grassed Waterway; 638 - Water and Sediment Control Basin; 342 - Critical Area Planting; 484 - Mulching; 410 - Grade Stabilization Structure; 468 - Lined Waterway or Outlet; 313 - Waste Storage Facility

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.). Conservation practice implementation including (but not limited to) grassed waterways have a high failure rate due to the prolonged wetness that prohibits plant germination and/or drowns new growth.

After Situation:

The drainage modifications result in reduced water in the upper horizons of the soil profile, allowing for sufficient aeration to allow vegetation to establish. Gully erosion and sediment transport are minimized by established vegetation, a direct result of removing excess water from the soil profile. Plant stress due to excessive wetness caused by a seasonal high water table is minimized, and drainage water quality is improved due to increased erosion control.

Scenario Feature Measure: length of pipe

Scenario Unit: Foot

Scenario Typical Size: 2,000

Scenario Cost: \$11,209.15

Scenario Cost/Unit: \$5.60

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 24" x 60"	1460	Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling.	Foot	\$3.54	2000	\$7,080.00
Materials						
Pipe, HDPE, 8", PCPT, Single Wall	1272	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 8" diameter - ASTM F667. Material cost only.	Foot	\$1.94	2000	\$3,880.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 606 - Subsurface Drain

Scenario: #4 - 10in CPP

Scenario Description:

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline, using a trencher. Scenario describes the construction 2,000 feet of 10-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth of 5 feet. Subsurface drainage is installed as a supporting practice for a number of associated conservation practices.

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; 620 - Underground Outlet; 412 - Grassed Waterway; 638 - Water and Sediment Control Basin; 342 - Critical Area Planting; 484 - Mulching; 410 - Grade Stabilization Structure; 468 - Lined Waterway or Outlet; 313 - Waste Storage Facility

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.). Conservation practice implementation including (but not limited to) grassed waterways have a high failure rate due to the prolonged wetness that prohibits plant germination and/or drowns new growth.

After Situation:

The drainage modifications result in reduced water in the upper horizons of the soil profile, allowing for sufficient aeration to allow vegetation to establish. Gully erosion and sediment transport are minimized by established vegetation, a direct result of removing excess water from the soil profile. Plant stress due to excessive wetness caused by a seasonal high water table is minimized, and drainage water quality is improved due to increased erosion control.

Scenario Feature Measure: length of pipe

Scenario Unit: Foot

Scenario Typical Size: 2,000

Scenario Cost: \$14,949.15

Scenario Cost/Unit: \$7.47

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 24" x 60"	1460	Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling.	Foot	\$3.54	2000	\$7,080.00
Materials						
Pipe, HDPE, 10", PCPT, Single Wall	1273	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 10" diameter - ASTM F667. Material cost only.	Foot	\$3.81	2000	\$7,620.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 606 - Subsurface Drain

Scenario: #5 - 12in CPP

Scenario Description:

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline, using a trencher. Scenario describes the construction 2,000 feet of 12-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth of 5 feet. Subsurface drainage is installed as a supporting practice for a number of associated conservation practices.

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; 620 - Underground Outlet; 412 - Grassed Waterway; 638 - Water and Sediment Control Basin; 342 - Critical Area Planting; 484 - Mulching; 410 - Grade Stabilization Structure; 468 - Lined Waterway or Outlet; 313 - Waste Storage Facility

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.). Conservation practice implementation including (but not limited to) grassed waterways have a high failure rate due to the prolonged wetness that prohibits plant germination and/or drowns new growth.

After Situation:

The drainage modifications result in reduced water in the upper horizons of the soil profile, allowing for sufficient aeration to allow vegetation to establish. Gully erosion and sediment transport are minimized by established vegetation, a direct result of removing excess water from the soil profile. Plant stress due to excessive wetness caused by a seasonal high water table is minimized, and drainage water quality is improved due to increased erosion control.

Scenario Feature Measure: length of pipe

Scenario Unit: Foot

Scenario Typical Size: 2,000

Scenario Cost: \$16,869.15

Scenario Cost/Unit: \$8.43

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 24" x 60"	1460	Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling.	Foot	\$3.54	2000	\$7,080.00
Materials						
Pipe, HDPE, 12", PCPT, Single Wall	1274	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 12" diameter - ASTM F667. Material cost only.	Foot	\$4.77	2000	\$9,540.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 606 - Subsurface Drain

Scenario: #6 - >/= 15in CPP

Scenario Description:

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline, using a trencher. Scenario describes the construction 2,000 feet of 15-inch, twin-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth of 5 feet. Subsurface drainage is installed as a supporting practice for a number of associated conservation practices.

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; 620 - Underground Outlet; 412 - Grassed Waterway; 638 - Water and Sediment Control Basin; 342 - Critical Area Planting; 484 - Mulching; 410 - Grade Stabilization Structure; 468 - Lined Waterway or Outlet; 313 - Waste Storage Facility

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.). Conservation practice implementation including (but not limited to) grassed waterways have a high failure rate due to the prolonged wetness that prohibits plant germination and/or drowns new growth.

After Situation:

The drainage modifications result in reduced water in the upper horizons of the soil profile, allowing for sufficient aeration to allow vegetation to establish. Gully erosion and sediment transport are minimized by established vegetation, a direct result of removing excess water from the soil profile. Plant stress due to excessive wetness caused by a seasonal high water table is minimized, and drainage water quality is improved due to increased erosion control.

Scenario Feature Measure: length of pipe

Scenario Unit: Foot

Scenario Typical Size: 2,000

Scenario Cost: \$23,061.15

Scenario Cost/Unit: \$11.53

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 24" x 60"	1460	Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling.	Foot	\$3.54	2000	\$7,080.00
Materials						
Pipe, HDPE, corrugated double wall, ≥ 15", soil tight, weight priced	1588	High Density Polyethylene (HDPE) compound manufactured into double wall corrugated pipe ≥ 15" diameter. Materials only.	Pound	\$1.71	9200	\$15,732.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 606 - Subsurface Drain

Scenario: #7 - Enveloped Corrugated Plastic Pipe (CPP), Single-Wall, ≤ 6in

Scenario Description:

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline with Sand-Gravel envelope, using a drainage trencher. Scenario includes the construction of 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. Subsurface drainage is installed as a supporting practice for a number of associated conservation practices including (but not limited to) perimeter drainage around a waste storage facility. 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; 620 - Underground Outlet; 412 - Grassed Waterway; 638 - Water and Sediment Control Basin; 342 - Critical Area Planting; 484 - Mulching; 410 - Grade Stabilization Structure; 468 - Lined Waterway or Outlet; 313 - Waste Storage Facility

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.). Conservation practice implementation including (but not limited to) waste storage facilities have a high failure rate due to uplift pressures damaging the integrity of the facility, particularly in high water table areas.

After Situation:

The drainage modifications result in reduced water in the upper horizons of the soil profile, preventing uplift pressures from damaging the integrity of installed structures. Excessive wetness caused by a seasonal high water table is minimized, and drainage water quality is improved due decreased erosion.

Scenario Feature Measure: length of pipe

Scenario Unit: Foot

Scenario Typical Size: 2,000

Scenario Cost: \$8,841.17

Scenario Cost/Unit: \$4.42

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
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	\$1.82	2000	\$3,640.00
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hour	\$86.28	8	\$690.24
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	\$29.64	8	\$237.12
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	\$1.61	1000	\$1,610.00
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	\$27.44	3	\$82.32
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$29.01	64	\$1,856.64
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	\$475.70	1	\$475.70
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 606 - Subsurface Drain

Scenario: #8 - Secondary Main Retrofit for DWM

Scenario Description:

An agricultural field has existing patterned tile system installed at 75 foot spacings. The field is 75 acres in size: 2475' x 1320', with a single main line at the low end of the field (2475'). The laterals are installed perpendicular to the topographic contours. The field has 3.5 feet of fall in the 1/4 mile length of the laterals, so a secondary main will be needed to allow drainage water management to be implemented on the higher half of the field.

Before Situation:

The patterned tile drainage system allows free flow of drainage water to a receiving ditch. Drainage water carries nitrogen and phosphorus out of the soil and these nutrients pollute the receiving waters.

After Situation:

A 12 inch diameter secondary mainline is retrofitted to the drainage system, located halfway up the field and relatively parallel to the topographic contours. This new mainline is hooked to each individual lateral and continued to a stable outlet. A Drainage Water practice must be completed along with the mainline; typically Structures for Water Control (587) installed at two foot vertical intervals so that water can be retained in the field. This scenario also applies to systems where the secondary main is used to connect drain lines that formerly each exited separately to the ditch, with a structure that distributes the drainage water into the subsurface soil at a vegetated buffer (772) OR a Denitrifying Bioreactor (747) might be installed at the outlet. In combination or singly, one of these practices must be installed with the secondary main.

Scenario Feature Measure: Feet of Pipe

Scenario Unit: Foot

Scenario Typical Size: 3,135

Scenario Cost: \$23,361.48

Scenario Cost/Unit: \$7.45

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.25	3135	\$7,053.75
Materials						
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	\$27.44	32	\$878.08
Pipe, HDPE, 12", PCPT, Single Wall	1274	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 12" diameter - ASTM F667. Material cost only.	Foot	\$4.77	3135	\$14,953.95
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	\$475.70	1	\$475.70

Practice: 612 - Tree/Shrub Establishment

Scenario: #1 - Hardwood Establishment, Direct Seeding

Scenario Description:

This practice involves planting of tree and shrubs through direct seeding after the site has been prepared for seedling growth and establishment. Planting rate will be approximately 3000 seed per acre. The productivity of the site is good and will handle a medium density planting rate. The resource concerns addressed is degraded plant condition -- undesirable plant productivity and health, and inadequate structure and composition and degraded wildlife habitat. Payment includes tree seed, equipment and labor to seed, and foregone income for the land taken out of crop production. Site preparation is implemented through associated practice 490 Tree/Shrub Site Preparation. Additional associated practices may include: 315 Herbaceous Weed Control, 660 Tree/Shrub Pruning, 484 Mulching

Before Situation:

The land has a little or no tree cover and has been intensively row cropped. Soil condition is degraded due to the loss 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:

Seed from native species are collected or purchased and planted at prescribed rates. 5 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.

Scenario Feature Measure: Area of Treatment

Scenario Unit: Acre

Scenario Typical Size: 5

Scenario Cost: \$4,108.21

Scenario Cost/Unit: \$821.64

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
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	\$1.93	8	\$15.44
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.22	8	\$289.76
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	\$22.85	8	\$182.80
Foregone Income						
Fl, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	2.5	\$1,094.40
Fl, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	2.5	\$1,076.08
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	\$38.65	8	\$309.20
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	8	\$190.88
Materials						
Trees and shrubs, seed	1871	Tree or shrub seed, e.g., acorns, to establish trees. Includes materials and shipping only.	Pound	\$4.67	150	\$700.50
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 612 - Tree/Shrub Establishment

Scenario: #2 - Hardwood Establishment, Direct Seeding, no Foregone Income

Scenario Description:

This practice involves planting of tree and shrubs through direct seeding after the site has been prepared for seedling growth and establishment. Planting rate will be approximately 3000 seed per acre. The productivity of the site is good and will handle a medium density planting rate. The resource concerns addressed is degraded plant condition -- undesirable plant productivity and health, and inadequate structure and composition and degraded wildlife habitat. Payment includes tree seed and equipment and labor to seed. Site preparation is implemented through associated practice 490 Tree/Shrub Site Preparation. Additional associated practices may include: 315 Herbaceous Weed Control, 660 Tree/Shrub Pruning, 484 Mulching

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 loss 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:

Seed from native species are collected or purchased and planted at prescribed rates. 5 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.

Scenario Feature Measure: Area of Treatment

Scenario Unit: Acre

Scenario Typical Size: 5

Scenario Cost: \$1,937.73

Scenario Cost/Unit: \$387.55

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$22.85	8	\$182.80
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.22	8	\$289.76
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	\$1.93	8	\$15.44
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	\$38.65	8	\$309.20
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	8	\$190.88
Materials						
Trees and shrubs, seed	1871	Tree or shrub seed, e.g., acorns, to establish trees. Includes materials and shipping only.	Pound	\$4.67	150	\$700.50
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 612 - Tree/Shrub Establishment

Scenario: #3 - Hardwood Establishment, Bareroot

Scenario Description:

This practice involves planting of bare-root hardwood tree seedlings after the site has been prepared for seedling growth and establishment. The productivity of the site is good and will support a planting rate of 436 trees per acre (10' x 10' spacing). Resource concerns addressed are degraded plant condition -- undesirable plant productivity and health, and inadequate structure and composition and degraded wildlife habitat. Payment includes bare-root seedlings, equipment and labor to plant, and foregone income for the land taken out of crop production. Site preparation is implemented through associated practice 490 Tree/Shrub Site Preparation. Additional associated practices may include: 315 Herbaceous Weed Control, 660 Tree/Shrub Pruning, 484 Mulching

Before Situation:

The land has a little or no tree cover and has been intensively row cropped. Soil condition is degraded due to the loss 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:

The 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.

Scenario Feature Measure: Area of Treatment

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: \$7,720.49

Scenario Cost/Unit: \$772.05

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$22.85	4	\$91.40
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	\$6.60	4	\$26.40
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.22	4	\$144.88
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	5	\$2,188.80
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	5	\$2,152.15
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	\$38.65	4	\$154.60
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	4	\$95.44
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	4	\$83.24
Materials						
Tree, hardwood, seedling or transplant, bare root, 16-36"	1510	Bare root hardwood trees 18-36" tall. Includes materials and shipping only.	Each	\$0.60	4360	\$2,616.00
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	\$167.58	1	\$167.58

Practice: 612 - Tree/Shrub Establishment

Scenario: #4 - Hardwood Establishment, Bareroot, Free Seedlings

Scenario Description:

This practice involves planting of bare-root hardwood tree seedlings after the site has been prepared for seedling growth and establishment. The productivity of the site is good and will support a planting rate of 436 trees per acre (10' x 10' spacing). Resource concerns addressed are degraded plant condition -- undesirable plant productivity and health, and inadequate structure and composition and degraded wildlife habitat. Payment includes equipment and labor to plant and foregone income for the land taken out of crop production. Seedlings are acquired for no charge to the landowner. Site preparation is implemented through associated practice 490 Tree/Shrub Site Preparation. Additional associated practices may include: 315 Herbaceous Weed Control, 660 Tree/Shrub Pruning, 484 Mulching

Before Situation:

The land has a little or no tree cover and has been intensively row cropped. Soil condition is degraded due to the loss 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:

The 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.

Scenario Feature Measure: Area of Treatment

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: \$5,104.49

Scenario Cost/Unit: \$510.45

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
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	\$6.60	4	\$26.40
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	\$22.85	4	\$91.40
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.22	4	\$144.88
Foregone Income						
Fl, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	5	\$2,152.15
Fl, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	5	\$2,188.80
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	\$38.65	4	\$154.60
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	4	\$95.44
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	4	\$83.24
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	\$167.58	1	\$167.58

Practice: 612 - Tree/Shrub Establishment

Scenario: #5 - Shrub Establishment, Bareroot

Scenario Description:

This practice involves planting of bare-root shrub seedlings after the site has been prepared for seedling growth and establishment. The productivity of the site is good and will support a planting rate of 1210 shrubs per acre (6' x 6' spacing). Plantings are in either uplands or bottomlands. The site lacks ground level habitat structure and diversity for wildlife. Resource concern is inadequate habitat for fish and wildlife - habitat fragmentation. Payment includes bare-root seedlings, equipment and labor to plant, and foregone income for the land taken out of crop production. Site preparation is implemented through associated practice 490 Tree/Shrub Site Preparation. Additional associated practices may include: 315 Herbaceous Weed Control, 660 Tree/Shrub Pruning, 484 Mulching

Before Situation:

The land has a little or no shrubby cover and has been intensively row cropped. Soil condition is degraded due to the loss 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:

Multiple small blocks of shrubs are planted that total 1 acre. The blocks are based on a habitat appraisal that determines the specific size and location to maximize habitat structure and diversity.

Scenario Feature Measure: Area of Treatment

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$1,565.10

Scenario Cost/Unit: \$1,565.10

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.22	4	\$144.88
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	\$11.62	4	\$46.48
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	0.5	\$215.22
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	0.5	\$218.88
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	\$38.65	4	\$154.60
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	\$20.81	4	\$83.24
Materials						
Shrub, seedling or transplant, bare root, 18"-36"	1507	Bare root hardwood trees 18-36" tall. Includes materials and shipping only.	Each	\$0.58	1210	\$701.80

Practice: 612 - Tree/Shrub Establishment

Scenario: #6 - Conifer Establishment, Bareroot

Scenario Description:

This practice involves planting of bare-root conifer tree seedlings after the site has been prepared for seedling growth and establishment. The productivity of the site is good and will support a planting rate of 436 trees per acre (10' x 10' spacing). Resource concerns addressed are degraded plant condition -- undesirable plant productivity and health, and inadequate structure and composition and degraded wildlife habitat. Payment includes bare-root seedlings, equipment and labor to plant, and foregone income for the land taken out of crop production. Site preparation is implemented through associated practice 490 Tree/Shrub Site Preparation. Additional associated practices may include: 315 Herbaceous Weed Control, 660 Tree/Shrub Pruning, 484 Mulching

Before Situation:

The land has a little or no tree cover and has been intensively row cropped. Soil condition is degraded due to the loss 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:

The 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.

Scenario Feature Measure: Area of Treatment

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: \$7,589.69

Scenario Cost/Unit: \$758.97

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
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	\$6.60	4	\$26.40
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	\$22.85	4	\$91.40
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.22	4	\$144.88
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	5	\$2,152.15
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	5	\$2,188.80
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	\$20.81	4	\$83.24
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	4	\$95.44
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	\$38.65	4	\$154.60
Materials						
Tree, conifer, seedling, bare root, 2-1	1514	Bare root conifer trees, 2-1 (3 years old). Includes materials and shipping only.	Each	\$0.57	4360	\$2,485.20
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	\$167.58	1	\$167.58

Practice: 612 - Tree/Shrub Establishment

Scenario: #7 - Bareroot Trees and Shrubs, Each

Scenario Description:

Bare-root trees and/or shrubs to be planted or interplanted to establish woody plants in any area where they can be grown for wildlife, erosion control, water quality improvement, carbon sequestration, forest products, and aesthetics. Resource concerns addressed are degraded plant condition -- undesirable plant productivity and health, and inadequate structure and composition and degraded wildlife habitat. Payment includes bare-root seedlings and equipment and labor to plant. Foregone income is not included with this scenario. Site preparation is implemented through associated practice 490 Tree/Shrub Site Preparation. Additional associated practices may include: 315 Herbaceous Weed Control, 660 Tree/Shrub Pruning, 484 Mulching.

Before Situation:

The land has little/no tree cover, is understocked, 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:

The 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.

Scenario Feature Measure: Area of Treatment

Scenario Unit: Each

Scenario Typical Size: 4,360

Scenario Cost: \$3,396.02

Scenario Cost/Unit: \$0.78

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
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	\$6.60	4	\$26.40
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	\$4.12	4	\$16.48
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	\$22.85	4	\$91.40
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.22	4	\$144.88
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	\$38.65	4	\$154.60
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	\$20.81	4	\$83.24
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	4	\$95.44
Materials						
Tree, hardwood, seedling or transplant, bare root, 16-36"	1510	Bare root hardwood trees 18-36" tall. Includes materials and shipping only.	Each	\$0.60	4360	\$2,616.00
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	\$167.58	1	\$167.58

Practice: 612 - Tree/Shrub Establishment

Scenario: #8 - Bareroot Tress and Shrubs, with Tree Shelters, Each

Scenario Description:

Bare-root trees and/or shrubs to be planted or interplanted to establish woody plants in any area where they can be grown for wildlife, erosion control, water quality improvement, carbon sequestration, forest products, and aesthetics. Seedlings are protected from deer browsing by installing tree tube shelters. Resource concerns addressed are degraded plant condition -- undesirable plant productivity and health, and inadequate structure and composition and degraded wildlife habitat. Payment includes bare-root seedlings, tree shelters, and equipment and labor to plant and install shelters. Foregone income is not included with this scenario. Site preparation is implemented through associated practice 490 Tree/Shrub Site Preparation. Additional associated practices may include: 315 Herbaceous Weed Control, 660 Tree/Shrub Pruning, 484 Mulching.

Before Situation:

The land has little/no tree cover, is understocked, 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:

The 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.

Scenario Feature Measure: Area of Treatment

Scenario Unit: Each

Scenario Typical Size: 4,360

Scenario Cost: \$14,811.30

Scenario Cost/Unit: \$3.40

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$22.85	4	\$91.40
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	\$4.12	4	\$16.48
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	\$6.60	4	\$26.40
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.22	4	\$144.88
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	\$38.65	4	\$154.60
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	\$20.81	12	\$249.72
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	4	\$95.44
Materials						
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	\$1.77	4360	\$7,717.20
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12") to assist in securing items. Materials only.	Each	\$0.05	8720	\$436.00
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	\$0.71	4360	\$3,095.60
Tree, hardwood, seedling or transplant, bare root, 16-36"	1510	Bare root hardwood trees 18-36" tall. Includes materials and shipping only.	Each	\$0.60	4360	\$2,616.00

Mobilization

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	\$167.58	1	\$167.58
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Practice: 612 - Tree/Shrub Establishment

Scenario: #9 - Hardwood Planting, 1 gallon pots

Scenario Description:

Improving the hardwood forest setting by hand planting containerized hardwood tree seedlings. The number of trees to plant (100 per acre) is lower than establishing a new forest. Resource concerns are degraded plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation. Site preparation is implemented through associated practice 490 Tree/Shrub Site Preparation. Additional associated practices may include: 315 Herbaceous Weed Control, 660 Tree/Shrub Pruning, 484 Mulching.

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 area of treatment is 5 acres. Containerized hardwood seedlings are planted by hand in the best locations for seedling survival. Post planting vegetation control is planned to ensure seedling survival.

Scenario Feature Measure: Area of Treatment

Scenario Unit: Acre

Scenario Typical Size: 5

Scenario Cost: \$4,597.40

Scenario Cost/Unit: \$919.48

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$11.62	30	\$348.60
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	\$38.65	30	\$1,159.50
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	30	\$624.30
Materials						
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	\$0.09	500	\$45.00
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	\$4.84	500	\$2,420.00

Practice: 612 - Tree/Shrub Establishment

Scenario: #10 - Hardwood Planting, 1 gallon pots with tree shelters

Scenario Description:

Improving the hardwood forest setting by hand planting containerized hardwood tree seedlings. Seedlings are protected from deer browsing. The number of trees to plant (100 per acre) is lower than establishing a new forest. Resource concerns are degraded plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation. Site preparation is implemented through associated practice 490 Tree/Shrub Site Preparation. Additional associated practices may include: 315 Herbaceous Weed Control, 660 Tree/Shrub Pruning, 484 Mulching.

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 area of treatment is 5 acres. Containerized hardwood seedlings are planted by hand in the best locations for seedling survival. Solid tree tubes are installed to protect seedlings from animal browsing damage. Post planting vegetation control is planned to ensure seedling survival.

Scenario Feature Measure: Area of Treatment

Scenario Unit: Acre

Scenario Typical Size: 5

Scenario Cost: \$7,446.70

Scenario Cost/Unit: \$1,489.34

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$11.62	30	\$348.60
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	\$20.81	60	\$1,248.60
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	\$38.65	30	\$1,159.50
Materials						
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	\$0.09	500	\$45.00
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	\$1.16	500	\$580.00
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12") to assist in securing items. Materials only.	Each	\$0.05	1000	\$50.00
Tree shelter, solid tube type, 4" x 36"	1565	4" x 36" tree tube for protection from animal damage. Materials only.	Each	\$3.19	500	\$1,595.00
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	\$4.84	500	\$2,420.00

Practice: 612 - Tree/Shrub Establishment

Scenario: #11 - Container Trees and Shrubs (3 gallon), Each

Scenario Description:

Containerized trees and/or shrubs (potted) to be planted or interplanted to establish woody plants in any area where they can be grown for wildlife, erosion control, water quality improvement, carbon sequestration, forest products, and aesthetics. Resource concerns are degraded plant condition - undesirable productivity and health, and inadequate structure and composition; inadequate habitat for fish and wildlife. Payment includes 3 gallon containerized plants and equipment and labor to plant. Foregone income is not included with this scenario. Site preparation is implemented through associated practice 490 Tree/Shrub Site Preparation. Additional associated practices may include: 315 Herbaceous Weed Control, 660 Tree/Shrub Pruning, 484 Mulching.

Before Situation:

The land has little/no tree cover, is understocked, 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:

The 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.

Scenario Feature Measure: Area of Treatment

Scenario Unit: Each

Scenario Typical Size: 100

Scenario Cost: \$1,167.48

Scenario Cost/Unit: \$11.67

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$11.62	6	\$69.72
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	\$38.65	6	\$231.90
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	\$20.81	6	\$124.86
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	\$7.41	100	\$741.00

Practice: 612 - Tree/Shrub Establishment

Scenario: #12 - Container Tress and Shrubs (3 gallon) with tree shelters, Each

Scenario Description:

Containerized trees and/or shrubs (potted) to be planted or interplanted to establish woody plants in any area where they can be grown for wildlife, erosion control, water quality improvement, carbon sequestration, forest products, and aesthetics. Seedlings are protected from deer browsing by installing tree tube shelters. Resource concerns are degraded plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife. Payment includes 3 gallon containerized plants, tree shelters, and equipment and labor to plant and install tree shelters. Foregone income is not included with this scenario. Site preparation is implemented through associated practice 490 Tree/Shrub Site Preparation. Additional associated practices may include: 315 Herbaceous Weed Control, 660 Tree/Shrub Pruning, 484 Mulching.

Before Situation:

The land has little/no tree cover, is understocked, 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:

The 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.

Scenario Feature Measure: Area of Treatment

Scenario Unit: Each

Scenario Typical Size: 100

Scenario Cost: \$1,667.34

Scenario Cost/Unit: \$16.67

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$11.62	6	\$69.72
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	\$38.65	6	\$231.90
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	\$20.81	12	\$249.72
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	\$7.41	100	\$741.00
Tree shelter, solid tube type, 5" x 48"	1571	5" x 48" tree tube for protection from animal damage. Materials only.	Each	\$2.09	100	\$209.00
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	\$1.56	100	\$156.00

Practice: 614 - Watering Facility

Scenario: #1 - Permanent Tank, <450 gallons

Scenario Description:

A permanent watering facility constructed of approved materials with less than 450 gallons of capacity that provides 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. Payment includes materials and labor costs for installing the watering tank, float valve, wildlife escape ramp, and freeze proof hydrant. A stabilized area under and around the watering facility is not included and must be addressed through an associated practice of Heavy Use Area Protection (561). 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:

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 habitat, water quality, or plant productivity and health needs to be improved.

After Situation:

A permanent watering facility with a capacity of less than 450 gallons is typically installed for 30 animal units 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 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 Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations will cause resource concerns will be protected by using Heavy Use Area Protection (561), as appropriate.

Scenario Feature Measure: Number of Watering Points

Scenario Unit: Each

Scenario Typical Size: 5

Scenario Cost: \$2,760.34

Scenario Cost/Unit: \$552.07

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$38.60	10	\$386.00
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	\$23.12	10	\$231.20
Materials						
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	\$0.82	40	\$32.80
Tank, Float Valve Assembly	1077	Float Valve, Stem, Swivel, Float Ball	Each	\$23.94	5	\$119.70
Tank, Galvanized, 400 gallon	279	Tank Galvanized - 400 gallon capacity	Each	\$233.86	5	\$1,169.30
Wildlife Escape Ramp	242	Pool size 15' x 30', for small mammals less than one pound	Each	\$24.47	5	\$122.35
Post, Wood, CCA Treated, 4-5" X 7'	1050	Wood Post, Line 4-5" X 7', CCA Treated. Includes materials and shipping only.	Each	\$7.90	10	\$79.00
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	\$1.63	101	\$164.63
Freeze Proof Hydrant, ≤ 3' Bury	240	Freeze Proof Hydrant, 3 foot or less bury. Materials only.	Each	\$76.41	5	\$382.05
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	\$73.31	1	\$73.31

Practice: 614 - Watering Facility

Scenario: #2 - Portable Tank

Scenario Description:

Establishment of a portable watering facility for livestock as part of an intensively managed grazing system where the livestock are frequently moved. Payment includes materials and labor costs for installing the watering tank, float valve, and freeze proof hydrant. If needed, a stabilized area under and around the watering facility is not included and must be addressed through an associated practice of Heavy Use Area Protection (561). Payment is based on the number of watering points (i.e. hydrants) installed, not the number of portable tanks used in the watering facility installation.

Before Situation:

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 habitat, water quality, or plant productivity and health needs to be improved.

After Situation:

This practice is typically installed for 30 animal units. It consists of a portable trough of either durable plastic, steel, or rubber that provides adequate water and access for the livestock. The trough includes a float for control of inflow of water. 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. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices: Pipeline (516), Critical Area Planting (342), Water Harvesting Catchment (636), Water Well (642), Pumping Plant (533), Spring Development (574), and Heavy Use Area Protection (561).

Scenario Feature Measure: Number of Watering Points

Scenario Unit: Each

Scenario Typical Size: 6

Scenario Cost: \$1,340.76

Scenario Cost/Unit: \$223.46

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$38.60	9	\$347.40
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	\$23.12	9	\$208.08
Materials						
Post, Wood, CCA Treated, 4-5" X 7'	1050	Wood Post, Line 4-5" X 7', CCA Treated. Includes materials and shipping only.	Each	\$7.90	12	\$94.80
Freeze Proof Hydrant, ≤ 3' Bury	240	Freeze Proof Hydrant, 3 foot or less bury. Materials only.	Each	\$76.41	6	\$458.46
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	\$0.82	48	\$39.36
Tank, Float Valve Assembly	1077	Float Valve, Stem, Swivel, Float Ball	Each	\$23.94	1	\$23.94
Tank, Polyethylene, 100 gallon	290	Portable heavy duty rubber stock tank.	Each	\$95.41	1	\$95.41
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	\$73.31	1	\$73.31

Practice: 614 - Watering Facility

Scenario: #3 - Tire Tank

Scenario Description:

A permanent watering facility constructed from a rubber tire that provides an 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. Payment includes materials and labor costs for installing the watering tank, float valve, wildlife escape ramp, and freeze proof hydrant. A stabilized area around the watering facility is not included and must be addressed through associated practices of Heavy Use Area Protection (561). 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:

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 habitat, water quality, or plant productivity and health needs to be improved.

After Situation:

This practice is typically installed for 50 animal units. It consists of a necessarily large rubber tire trough, that provides adequate water and access for the livestock. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices: Pipeline (516), Critical Area Planting (342), Water Harvesting Catchment (636), Water Well (642), Pumping Plant (533), Spring Development (574), and Heavy Use Area Protection (561). Areas around watering facilities where animal concentrations will cause resource concerns will be protected by using Heavy Use Area Protection (561), as appropriate.

Scenario Feature Measure: Number of Watering Points

Scenario Unit: Each

Scenario Typical Size: 5

Scenario Cost: \$6,198.90

Scenario Cost/Unit: \$1,239.78

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$145.52	1.6	\$232.83
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$58.14	10	\$581.40
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$38.60	10	\$386.00
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	\$23.12	10	\$231.20
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	\$40.44	10	\$404.40
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	\$1.63	101	\$164.63
Tank, Float Valve Assembly	1077	Float Valve, Stem, Swivel, Float Ball	Each	\$23.94	5	\$119.70
Wildlife Escape Ramp	242	Pool size 15' x 30', for small mammals less than one pound	Each	\$24.47	5	\$122.35
Tank, Tire, 8' diameter	286	Tire, includes material cost for tank and shipping. Labor and other appurtenance costs not included.	Each	\$723.52	5	\$3,617.60
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	\$73.31	1	\$73.31

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$265.48	1	\$265.48
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Practice: 614 - Watering Facility

Scenario: #4 - Large Permanent Tank, 500-1000 gallons, or Fountain

Scenario Description:

Establishment of a large permanent watering facility using materials such as a large concrete trough or fountain type waterers. Payment includes materials and labor costs for installing the watering tank, float valve, wildlife escape ramp, and freeze proof hydrant. A stabilized area under and around the watering facility is not included and must be addressed through an associated practice of Heavy Use Area Protection (561).

Before Situation:

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 habitat, water quality, or plant productivity and health needs to be improved.

After Situation:

This practice is typically installed for 50 animal units. It consists of a necessarily large permanent concrete trough, or fountain type waterer that provides adequate water and access for the livestock. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices: Pipeline (516), Critical Area Planting (342), Water Harvesting Catchment (636), Water Well (642), Pumping Plant (533), Spring Development (574), and Heavy Use Area Protection (561). Areas around watering facilities where animal concentrations will cause resource concerns will be protected by using Heavy Use Area Protection (561), as appropriate.

Scenario Feature Measure: Number of Watering Points

Scenario Unit: Each

Scenario Typical Size: 5

Scenario Cost: \$6,638.19

Scenario Cost/Unit: \$1,327.64

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$38.60	15	\$579.00
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	\$23.12	15	\$346.80
Materials						
Wildlife Escape Ramp	242	Pool size 15' x 30', for small mammals less than one pound	Each	\$24.47	5	\$122.35
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	\$1.63	101	\$164.63
Tank, Float Valve Assembly	1077	Float Valve, Stem, Swivel, Float Ball	Each	\$23.94	5	\$119.70
Post, Wood, CCA Treated, 4-5" X 7'	1050	Wood Post, Line 4-5" X 7', CCA Treated. Includes materials and shipping only.	Each	\$7.90	10	\$79.00
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	\$0.82	40	\$32.80
Freeze Proof Hydrant, ≤ 3' Bury	240	Freeze Proof Hydrant, 3 foot or less bury. Materials only.	Each	\$76.41	5	\$382.05
Tank, Concrete, 500 gallon	1049	Concrete tank for water storage, with riser and lid. Includes materials and delivery	Each	\$947.71	5	\$4,738.55
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	\$73.31	1	\$73.31

Practice: 614 - Watering Facility

Scenario: #5 - Above Ground Storage, 1,000 - 3,000 gallons

Scenario Description:

A permanent watering facility constructed of approved materials having 1,000 to 3,000 gallons of water storage capacity for an adequate quantity and quality of water in situations where a lower capacity water supply source such as a spring or solar pump is the only feasible water source and backup capacity is needed during peak water demand periods. 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. Payment includes materials and labor costs for installing the storage tank. A stabilized area under and around the watering facility is not included and must be addressed through an associated practice of Heavy Use Area Protection (561). This watering facility will address the resource concerns of inadequate supply of water for livestock, habitat degradation, water quality, and undesirable plant productivity and health.

Before Situation:

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 habitat, water quality, or plant productivity and health needs to be improved.

After Situation:

A permanent watering facility with water storage capacity of 1,000 to 3,000 gallons is typically installed for 30 animal units to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife. Installation facilitates 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 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 Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

Scenario Feature Measure: Number of tanks

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$2,255.58

Scenario Cost/Unit: \$2,255.58

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$58.14	2	\$116.28
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$38.60	2	\$77.20
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	\$23.12	2	\$46.24
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	\$40.44	2	\$80.88
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	\$1.63	13	\$21.19
Tank, Poly Enclosed Storage, >1,000	1075	Water storage tanks. Includes materials and shipping only.	Gallon	\$0.63	2500	\$1,575.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$265.48	1	\$265.48

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	\$73.31	1	\$73.31
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Practice: 614 - Watering Facility

Scenario: #6 - Above Ground Storage, >3,000 gallons

Scenario Description:

Establishment of a large permanent watering facility having 3,001 to 5,000 gallons of water storage capacity for an adequate quantity and quality of water in situations where a lower capacity water supply source such as a spring or solar pump is the only feasible water source and backup capacity is needed during peak water demand periods. 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. Payment includes materials and labor costs for installing the storage tank. A stabilized area under and around the watering facility is not included and must be addressed through an associated practice of Heavy Use Area Protection (561). This watering facility will address the resource concerns of inadequate supply of water for livestock, habitat degradation, water quality, and undesirable plant productivity and health.

Before Situation:

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 habitat, water quality, or plant productivity and health needs to be improved.

After Situation:

A permanent watering facility with water storage capacity of 3,001 to 5,000 gallons is typically installed for 50 animal units to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife. Installation facilitates 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 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 Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

Scenario Feature Measure: Number of tanks

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$3,675.88

Scenario Cost/Unit: \$3,675.88

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$58.14	3	\$174.42
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$38.60	3	\$115.80
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	\$23.12	3	\$69.36
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	\$40.44	3	\$121.32
Materials						
Tank, Poly Enclosed Storage, >1,000	1075	Water storage tanks. Includes materials and shipping only.	Gallon	\$0.63	4500	\$2,835.00
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	\$1.63	13	\$21.19
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	\$73.31	1	\$73.31

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$265.48	1	\$265.48
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Practice: 614 - Watering Facility

Scenario: #7 - Underground Storage Tank

Scenario Description:

A precast concrete tank used for storing water as part of a watering system. The storage tank will consist of 1 storage tank (2500 gal.) adequate base material and backfill around the tank, access riser with lid, and 20 ft of 4 inch for overflow pipe.

Before Situation:

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 habitat, water quality, or plant productivity and health needs to be improved.

After Situation:

A permanent watering facility for livestock constructed of approved materials with a 2,500 gallons of additional storage capacity for adequate quantity and quality of water for storage when backup capacity is needed peak water demand periods. 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 Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Pipeline (516) as appropriate.

Scenario Feature Measure: Number of tanks

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$4,770.90

Scenario Cost/Unit: \$4,770.90

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$118.42	5	\$592.10
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	\$23.12	5	\$115.60
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	\$40.44	5	\$202.20
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	\$17.46	2	\$34.92
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	\$1.63	40	\$65.20
Tank, Concrete, 2500 gallon	1055	Concrete tank for water storage, with riser and lid. Includes materials and delivery.	Each	\$3,180.70	1	\$3,180.70
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	\$73.31	1	\$73.31
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$506.87	1	\$506.87

Practice: 614 - Watering Facility

Scenario: #8 - Frost Free Waterer

Scenario Description:

A permanent watering facility constructed of approved materials that provides adequate quantity and quality of water for 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. Payment includes materials and labor costs for installing the frost free waterer. The stabilized area under and around the watering facility is not included and must be addressed through an associated practice of Heavy Use Area Protection (561). 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:

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 habitat, water quality, or plant productivity and health needs to be improved.

After Situation:

A permanent watering facility is typically installed for 30 animal units with all waterer materials to provide an adequate supply and quality of water for livestock or wildlife for 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 Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). Any needed water source installation will use Water Well (642), Pumping Plant (533), or Pipeline (516) as appropriate. Areas around watering facilities where animal concentration will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

Scenario Feature Measure: Number of Waterers

Scenario Unit: Each

Scenario Typical Size: 5

Scenario Cost: \$6,842.59

Scenario Cost/Unit: \$1,368.52

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$38.60	10	\$386.00
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$58.14	10	\$581.40
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	\$23.12	10	\$231.20
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	\$40.44	10	\$404.40
Materials						
Tank, Float Valve Assembly	1077	Float Valve, Stem, Swivel, Float Ball	Each	\$23.94	5	\$119.70
Tank, Geothermal Tube Waterer	1062	Two head 18 gallon waterer. Includes materials and shipping only.	Each	\$956.22	5	\$4,781.10
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$265.48	1	\$265.48
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	\$73.31	1	\$73.31

Practice: 614 - Watering Facility

Scenario: #9 - Access Ramp

Scenario Description:

The bank of the stream or pond is severely eroded and water quality is poor due to the unrestricted access of livestock or wildlife. A conservation plan includes provisions for controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, or provide a water source that is an alternative to a sensitive resource.

Before Situation:

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

After Situation:

A permanent watering ramp with a level section at the base is installed to provide drinking water for livestock or wildlife. The access ramp is constructed of approved materials consisting of rock and or gravel surfacing on geotextile fabric foundation, with a life expectancy that meets or exceeds the planned useful life of the installation. The resource concerns of inadequate supply of water for livestock or wildlife, soil erosion, habitat degradation, water quality, and undesirable plant productivity and health have been addressed. The watering facility includes all materials, equipment, and labor to shape the ramp and install the surfacing material. Seeding of berms and construction areas is to be specified using 342 - Critical Area Planting, and 484 – Mulching, as needed. Use 382 - Fence to limit livestock access.

Scenario Feature Measure: Area of access ramp

Scenario Unit: Square Foot

Scenario Typical Size: 560

Scenario Cost: \$1,065.93

Scenario Cost/Unit: \$1.90

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.19	39	\$85.41
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.31	84	\$194.04
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	24	\$607.92
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	\$178.56	1	\$178.56

Practice: 620 - Underground Outlet

Scenario: #1 - ≤ 5in Diameter Pipe with Catch Basin

Scenario Description:

Scenario is for the Installation of a 5" or less diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, precast concrete drop inlet with steel grate, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

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:

Excessive sedimentation and soil erosion is controlled 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.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 500

Scenario Cost: \$1,926.49

Scenario Cost/Unit: \$3.85

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
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	\$1.99	2	\$3.98
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	500	\$665.00
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	\$38.65	2	\$77.30
Materials						
Pipe, HDPE, 5", PCPT, Single Wall	1271	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 5" diameter - ASTM F405. Material cost only.	Foot	\$0.69	480	\$331.20
Pipe, PVC, 4", SDR 35	992	Materials: - 4" - PVC - SDR 35 - ASTM D3034	Foot	\$1.66	20	\$33.20
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	\$566.66	1	\$566.66
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #2 - ≤ 5in Diameter Pipe with Risers

Scenario Description:

Scenario is for the Installation of a 5" or less diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, perforated PVC riser inlet, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

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.

After Situation:

Excessive sedimentation and soil erosion is controlled after UGO is intalled in association with terraces or water and sediment control basin.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 500

Scenario Cost: \$1,499.15

Scenario Cost/Unit: \$3.00

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	500	\$665.00
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	\$1.99	2	\$3.98
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	\$38.65	2	\$77.30
Materials						
Pipe, PVC, 4", SDR 35	992	Materials: - 4" - PVC - SDR 35 - ASTM D3034	Foot	\$1.66	20	\$33.20
Pipe, HDPE, 5", PCPT, Single Wall	1271	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 5" diameter - ASTM F405. Material cost only.	Foot	\$0.69	480	\$331.20
Inlet, riser, 6"	1261	Riser, polymer, complete vertical perforated UGO inlet with Tee, orifice plate if needed, 6" diameter. Materials only.	Each	\$69.66	2	\$139.32
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #3 - 6in Diameter Pipe with Catch Basin

Scenario Description:

Scenario is for the Installation of a 6" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, precast concrete drop inlet with steel grate, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

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:

Excessive sedimentation and soil erosion is controlled 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.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 500

Scenario Cost: \$2,173.89

Scenario Cost/Unit: \$4.35

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	500	\$665.00
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	\$1.99	2	\$3.98
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	\$38.65	2	\$77.30
Materials						
Pipe, HDPE, 6", CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only.	Foot	\$1.12	480	\$537.60
Pipe, PVC, 6", SDR 35	993	Materials: - 6" - PVC - SDR 35 - ASTM D3034	Foot	\$3.71	20	\$74.20
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	\$566.66	1	\$566.66
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #4 - 6in Diameter Pipe with Risers

Scenario Description:

Scenario is for the Installation of a 6" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, perforated PVC riser inlet, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

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.

After Situation:

Excessive sedimentation and soil erosion is controlled after UGO is intalled in association with terraces or water and sediment control basin.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 500

Scenario Cost: \$1,746.55

Scenario Cost/Unit: \$3.49

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
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	\$1.99	2	\$3.98
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	500	\$665.00
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	\$38.65	2	\$77.30
Materials						
Pipe, PVC, 6", SDR 35	993	Materials: - 6" - PVC - SDR 35 - ASTM D3034	Foot	\$3.71	20	\$74.20
Pipe, HDPE, 6", CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only.	Foot	\$1.12	480	\$537.60
Inlet, riser, 6"	1261	Riser, polymer, complete vertical perforated UGO inlet with Tee, orifice plate if needed, 6" diameter. Materials only.	Each	\$69.66	2	\$139.32
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #5 - 8in Diameter Pipe with Catch Basin

Scenario Description:

Scenario is for the Installation of a 8" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, precast concrete drop inlet with steel grate, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

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:

Excessive sedimentation and soil erosion is controlled 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.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 500

Scenario Cost: \$2,626.49

Scenario Cost/Unit: \$5.25

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	500	\$665.00
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	\$1.99	2	\$3.98
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	\$38.65	2	\$77.30
Materials						
Pipe, HDPE, 8", PCPT, Single Wall	1272	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 8" diameter - ASTM F667. Material cost only.	Foot	\$1.94	480	\$931.20
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	\$566.66	1	\$566.66
Pipe, PVC, 8", SDR 35	994	Materials: - 8" - PVC - SDR 35 - ASTM D3034	Foot	\$6.66	20	\$133.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #6 - 8in Diameter Pipe with Risers

Scenario Description:

Scenario is for the Installation of a 8" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, perforated PVC riser inlet, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

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.

After Situation:

Excessive sedimentation and soil erosion is controlled after UGO is intalled in association with terraces or water and sediment control basin.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 500

Scenario Cost: \$2,276.55

Scenario Cost/Unit: \$4.55

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
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	\$1.99	2	\$3.98
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	500	\$665.00
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	\$38.65	2	\$77.30
Materials						
Pipe, HDPE, 8", PCPT, Single Wall	1272	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 8" diameter - ASTM F667. Material cost only.	Foot	\$1.94	480	\$931.20
Pipe, PVC, 8", SDR 35	994	Materials: - 8" - PVC - SDR 35 - ASTM D3034	Foot	\$6.66	20	\$133.20
Inlet, riser, 8"	1262	Riser, polymer, complete vertical perforated UGO inlet with Tee, orifice plate if needed, 8" diameter. Materials only.	Each	\$108.36	2	\$216.72
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #7 - 10in Diameter Pipe with Catch Basin

Scenario Description:

Scenario is for the Installation of a 10" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, precast concrete drop inlet with steel grate, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

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:

Excessive sedimentation and soil erosion is controlled 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.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 500

Scenario Cost: \$4,786.59

Scenario Cost/Unit: \$9.57

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, clay, 24" x 48"	55	Trenching, earth, clay, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling and shoring/dewatering	Foot	\$3.55	500	\$1,775.00
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	\$1.99	2	\$3.98
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	\$38.65	4	\$154.60
Materials						
Pipe, PVC, 10", SDR 35	1251	Pipe, PVC, SDR 35, 10" Diameter - ASTM D3034. Material cost only.	Foot	\$10.42	20	\$208.40
Pipe, HDPE, 10", PCPT, Single Wall	1273	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 10" diameter - ASTM F667. Material cost only.	Foot	\$3.81	480	\$1,828.80
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	\$566.66	1	\$566.66
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #8 - 10in Diameter Pipe with Risers

Scenario Description:

Scenario is for the Installation of a 10" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, perforated PVC riser inlet, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

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.

After Situation:

Excessive sedimentation and soil erosion is controlled after UGO is intalled in association with terraces or water and sediment control basin.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 500

Scenario Cost: \$4,513.79

Scenario Cost/Unit: \$9.03

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
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	\$1.99	2	\$3.98
Trenching, Earth, clay, 24" x 48"	55	Trenching, earth, clay, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling and shoring/dewatering	Foot	\$3.55	500	\$1,775.00
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	\$38.65	4	\$154.60
Materials						
Pipe, PVC, 10", SDR 35	1251	Pipe, PVC, SDR 35, 10" Diameter - ASTM D3034. Material cost only.	Foot	\$10.42	20	\$208.40
Pipe, HDPE, 10", PCPT, Single Wall	1273	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 10" diameter - ASTM F667. Material cost only.	Foot	\$3.81	480	\$1,828.80
Inlet, riser, 10"	1263	Riser, polymer, complete vertical perforated UGO inlet with Tee, orifice plate if needed, 10" diameter. Materials only.	Each	\$146.93	2	\$293.86
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #9 - ≥12in Diameter Pipe with Catch Basin

Scenario Description:

Scenario is for the Installation of a 12" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, precast concrete drop inlet with steel grate, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

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:

Excessive sedimentation and soil erosion is controlled 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.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 500

Scenario Cost: \$5,662.56

Scenario Cost/Unit: \$11.33

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, clay, 24" x 48"	55	Trenching, earth, clay, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling and shoring/dewatering	Foot	\$3.55	500	\$1,775.00
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	\$1.99	2	\$3.98
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	\$38.65	4	\$154.60
Materials						
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	\$745.03	1	\$745.03
Pipe, HDPE, 12", PCPT, Single Wall	1274	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 12" diameter - ASTM F667. Material cost only.	Foot	\$4.77	480	\$2,289.60
Pipe, PVC, 12", SDR 35	1252	Pipe, PVC, SDR 35, 12" Diameter - ASTM D3034. Material cost only.	Foot	\$22.26	20	\$445.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #10 - ≥12in Diameter Pipe with Risers

Scenario Description:

Scenario is for the Installation of a 12" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, perforated PVC riser inlet, trench excavation, and trench backfill. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

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.

After Situation:

Excessive sedimentation and soil erosion is controlled after UGO is intalled in association with terraces or water and sediment control basin.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 500

Scenario Cost: \$5,988.27

Scenario Cost/Unit: \$11.98

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, clay, 24" x 48"	55	Trenching, earth, clay, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling and shoring/dewatering	Foot	\$3.55	500	\$1,775.00
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	\$1.99	2	\$3.98
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	\$38.65	4	\$154.60
Materials						
Inlet, riser, 12"	1264	Riser, polymer, complete vertical perforated UGO inlet with Tee, orifice plate if needed, 12" diameter. Materials only.	Each	\$535.37	2	\$1,070.74
Pipe, HDPE, 12", PCPT, Single Wall	1274	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 12" diameter - ASTM F667. Material cost only.	Foot	\$4.77	480	\$2,289.60
Pipe, PVC, 12", SDR 35	1252	Pipe, PVC, SDR 35, 12" Diameter - ASTM D3034. Material cost only.	Foot	\$22.26	20	\$445.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #11 - Blind Inlet

Scenario Description:

Install an excavated earthen box with perforated collector tubing placed in the bottom and filled to the surface with bedding material and rock riprap to direct surface flow into a "main line" or subsurface drain. Typically installed at the upper end of a waterway to protect the vegetation of the waterway from prolonged surface flow, thus facilitating vegetative growth and controlling ephemeral gully erosion. Costs include the collection pipe, excavation, and rock. This practice is often installed in conjunction with waterways or similar practices.

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.

After Situation:

Excessive sedimentation and soil erosion is controlled through the installation of the blind inlet and grassed waterway. Vegetation is successfully established within the waterway.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 40

Scenario Cost: \$2,317.10

Scenario Cost/Unit: \$57.93

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.38	30	\$71.40
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	\$1.76	30	\$52.80
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	\$38.65	2	\$77.30
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$60.72	15	\$910.80
Pipe, HDPE, 6", CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only.	Foot	\$1.12	40	\$44.80
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$29.01	15	\$435.15
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$475.70	1	\$475.70

Practice: 620 - Underground Outlet

Scenario: #12 - Blind Inlet for Water Quality

Scenario Description:

Install an excavated earthen box with perforated collector tubing placed in the bottom and filled to the surface with bedding material and sand/fine gravel to direct surface flow into a "main line" or subsurface drain. Typically installed in low areas to replace surface risers, thus reducing direct flow of sediment into tile and out to stream. Costs include the collection pipe, excavation, gravel and sand layers. This practice can be installed in conjunction with small drainage area WASCoBs or similar practices.

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 enters surface riser.

After Situation:

Runoff water is filtered through blind inlet before outleting through tile. Excessive sedimentation and soil erosion is controlled.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Blind Inlet

Scenario Unit: Feet

Scenario Typical Size: 14

Scenario Cost: \$1,202.92

Scenario Cost/Unit: \$85.92

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.38	22	\$52.36
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	\$1.76	22	\$38.72
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	\$38.65	2	\$77.30
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$28.63	8	\$229.04
Pipe, PVC, 4", SDR 26	989	Materials: - 4" - PVC - SDR 26 160 psi - ASTM D2241	Foot	\$2.20	50	\$110.00
Pipe, HDPE, 6", CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only.	Foot	\$1.12	10	\$11.20
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$29.01	15	\$435.15
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #13 - Trickle Flow Collector

Scenario Description:

Install a perforated pipe to collect surface flow and redirect water to a subsurface outlet. The Trickle Flow Collector consists of a rock/rip rap area bedded around the perforated pipe to trap sediment prior to outletting water. Scenario describes a 10' long by 30' wide by 1.5' deep rectangular shaped area lined with riprap. This scenario includes the installation of pipe in the bottom of the rock bedding to serve as a trickle flow collector. These typically are installed adjacent to waterway and with same flow dimensions. Half the flow channel is excavated, before excavation for riprap. Excess excavation is spoiled in the immediate area. Cost include excavation, spoiling of excess material, geotextile underlayment and installing Rock Riprap. TFC area is measured from upstream to downstream flow catchment area.

Before Situation:

Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Erosion is occurring in areas that cannot maintain established vegetation and are not otherwise protected. Water quality is compromised as nutrient/pesticide-laden sediments are leaving the site. Water quantity is also a concern as excessive surface water flow is contributing to gully erosion.

After Situation:

Rock lined area is 10' long by 30' wide by 1.5' deep. This armor will result in a protected surface to address the initial concern of erosion. Placement of the perforated pipe and rock/rip rap bedding will not only armor the surface area from erosion, but will provide a filter for trapping sediment laden with nutrients and/or pesticides, to result in an improvement to water quality. Area is excavated and rock is placed using a hydraulic excavator. Geotextile underlayment is installed by laborers.

Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).

Scenario Feature Measure: Width of collector area (ft)

Scenario Unit: Linear Foot

Scenario Typical Size: 30

Scenario Cost: \$1,722.45

Scenario Cost/Unit: \$57.42

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.25	22	\$49.50
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	\$38.65	2	\$77.30
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	1	\$20.81
Materials						
Pipe, PVC, 4", SCH 40	978	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	\$3.98	40	\$159.20
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$60.72	13	\$789.36
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$29.01	13	\$377.13
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #14 - ≤5in Diameter Pipe

Scenario Description:

Scenario is for the Installation of a 5" or less diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, trench excavation, and trench backfill. The typical use for this scenario is non-pressure underground outlet for roof runoff management and non-perforated outlet for upstream drainage installed adjacent to a wetland.

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:

Excessive sedimentation and soil erosion is controlled 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.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 200

Scenario Cost: \$753.83

Scenario Cost/Unit: \$3.77

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	200	\$266.00
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	\$1.99	2	\$3.98
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	\$38.65	2	\$77.30
Materials						
Pipe, PVC, 4", SDR 35	992	Materials: - 4" - PVC - SDR 35 - ASTM D3034	Foot	\$1.66	20	\$33.20
Pipe, HDPE, 5", PCPT, Single Wall	1271	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 5" diameter - ASTM F405. Material cost only.	Foot	\$0.69	180	\$124.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #15 - 6in Diameter Pipe

Scenario Description:

Scenario is for the Installation of a 6" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, trench excavation, and trench backfill. The typical use for this scenario is non-pressure underground outlet for roof runoff management and non-perforated outlet for upstream drainage installed adjacent to a wetland.

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:

Excessive sedimentation and soil erosion is controlled 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.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 200

Scenario Cost: \$872.23

Scenario Cost/Unit: \$4.36

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	200	\$266.00
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	\$1.99	2	\$3.98
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	\$38.65	2	\$77.30
Materials						
Pipe, HDPE, 6", CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only.	Foot	\$1.12	180	\$201.60
Pipe, PVC, 6", SDR 35	993	Materials: - 6" - PVC - SDR 35 - ASTM D3034	Foot	\$3.71	20	\$74.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #16 - 8in Diameter Pipe

Scenario Description:

Scenario is for the Installation of a 8" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, trench excavation, and trench backfill. The typical use for this scenario is non-pressure underground outlet for roof runoff management and non-perforated outlet for upstream drainage installed adjacent to a wetland.

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:

Excessive sedimentation and soil erosion is controlled 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.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 200

Scenario Cost: \$1,078.83

Scenario Cost/Unit: \$5.39

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	200	\$266.00
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	\$1.99	2	\$3.98
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	\$38.65	2	\$77.30
Materials						
Pipe, PVC, 8", SDR 35	994	Materials: - 8" - PVC - SDR 35 - ASTM D3034	Foot	\$6.66	20	\$133.20
Pipe, HDPE, 8", PCPT, Single Wall	1272	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 8" diameter - ASTM F667. Material cost only.	Foot	\$1.94	180	\$349.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #17 - 10in Diameter Pipe

Scenario Description:

Scenario is for the Installation of a 10" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, trench excavation, and trench backfill. The typical use for this scenario is non-pressure underground outlet for roof runoff management and non-perforated outlet for upstream drainage installed adjacent to a wetland.

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:

Excessive sedimentation and soil erosion is controlled 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.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 200

Scenario Cost: \$2,011.93

Scenario Cost/Unit: \$10.06

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, clay, 24" x 48"	55	Trenching, earth, clay, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling and shoring/dewatering	Foot	\$3.55	200	\$710.00
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	\$1.99	2	\$3.98
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	\$38.65	4	\$154.60
Materials						
Pipe, HDPE, 10", PCPT, Single Wall	1273	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 10" diameter - ASTM F667. Material cost only.	Foot	\$3.81	180	\$685.80
Pipe, PVC, 10", SDR 35	1251	Pipe, PVC, SDR 35, 10" Diameter - ASTM D3034. Material cost only.	Foot	\$10.42	20	\$208.40
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 620 - Underground Outlet

Scenario: #18 - ≥12in Diameter Pipe

Scenario Description:

Scenario is for the Installation of a 12" diameter approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Payment includes pipe, trench excavation, and trench backfill. The typical use for this scenario is non-pressure underground outlet for roof runoff management and non-perforated outlet for upstream drainage installed adjacent to a wetland.

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:

Excessive sedimentation and soil erosion is controlled 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.

Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Scenario Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 200

Scenario Cost: \$2,421.53

Scenario Cost/Unit: \$12.11

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
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	\$1.99	2	\$3.98
Trenching, Earth, clay, 24" x 48"	55	Trenching, earth, clay, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling and shoring/dewatering	Foot	\$3.55	200	\$710.00
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	\$38.65	4	\$154.60
Materials						
Pipe, HDPE, 12", PCPT, Single Wall	1274	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 12" diameter - ASTM F667. Material cost only.	Foot	\$4.77	180	\$858.60
Pipe, PVC, 12", SDR 35	1252	Pipe, PVC, SDR 35, 12" Diameter - ASTM D3034. Material cost only.	Foot	\$22.26	20	\$445.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 629 - Waste Treatment

Scenario: #2 - Milking Parlor Waste Treatment System with Dosing System

Scenario Description:

This practice scenario includes a dosed treatment system for milking parlor wastewater that will outlet to a constructed wetland and/or vegetated treatment area and/or other acceptable treatment. The purpose of the practice is to address resource concerns related to water quality degradation due to (excess nutrient, salts and pathogens).

Associated practices: Constructed Wetland (656), Vegetated Treatment Area (635), Waste Transfer (634), Nutrient Management (590), Pumping Plant (533), Fence (382), & Waste Storage Facility (313)

Before Situation:

Milkhouse waste water currently outlets in an untreated manner which presents potential soil, water and air quality concerns.

After Situation:

This scenario assumes that the treatment system is designed for 500 gal/day of wastewater from the milking parlor. It assumes a two tank scenario. The grease trap acts as the primary settling basin. The wastewater overflows into the septic tank, which is then dosed to a treatment area (constructed wetland and/or vegetated treatment area and/or other acceptable treatment). This practice scenario reduces nutrient content, organic strength, or pathogen levels of agricultural waste; improve air quality by reducing odors and gaseous emissions (methane or ammonia).

Scenario Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$8,573.49

Scenario Cost/Unit: \$8,573.49

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$44.18	1	\$44.18
Equipment/Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.51	100	\$551.00
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	\$3.51	120	\$421.20
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	450	\$598.50
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	\$31.19	16	\$499.04
Materials						
Dosing System, siphon	1763	Dosing system siphon with typical 3" diameter and 12" drawdown. Includes materials and shipping only.	Each	\$272.65	1	\$272.65
Prefabricated concrete septic tank, 1500 gal	1738	Precast concrete septic tank, 1,500 gal. Materials only.	Each	\$1,705.67	2	\$3,411.34
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	\$20.00	5	\$100.00
Pipe, PVC, 4", SCH 40	978	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	\$3.98	200	\$796.00
Pipe, PE, 3", DR 9	1001	Materials: - 3" - PE - 160 psi - ASTM D3035 DR 9	Foot	\$4.67	250	\$1,167.50
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	\$68.80	1	\$68.80

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	\$167.58	1	\$167.58
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$475.70	1	\$475.70

Practice: 632 - Waste Separation Facility

Scenario: #1 - Earthen Settling Structure

Scenario Description:

An earthen structure, such as a basin or a terrace or dike like structure, used to capture and separate a portion of the solids from a liquid stream from a feedlot or confinement facility. A concrete pad should be installed on the bottom of the basin and around outlet structures to facilitate cleanout. 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 Recycling (633), Waste Transfer (634), 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 earthen settling basin structure (60 ft wide by 200 ft long by 3 ft deep, with three screening outlet structures) constructed around or at a livestock feeding operation. Removes a portion of the solids that otherwise would leave with the runoff from an animal feeding operation. Part of an animal waste management system.

Scenario Feature Measure: Cubic Foot of Total Storage

Scenario Unit: Cubic Foot

Scenario Typical Size: 30,000

Scenario Cost: \$7,995.75

Scenario Cost/Unit: \$0.27

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$128.74	12	\$1,544.88
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.19	1000	\$4,190.00
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	\$20.81	8	\$166.48
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$29.01	14	\$406.14
Weeping Wall	1765	Weeping wall or picket screen structure for solid settling basin. Materials only.	Foot	\$52.98	24	\$1,271.52
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	\$167.58	1	\$167.58
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 632 - Waste Separation Facility

Scenario: #2 - Concrete Basin

Scenario Description:

A concrete structure, such as a basin with concrete walls and floor, used to capture and separate a portion of the solids from a liquid stream from a feedlot or 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 Recycling (633), 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 3' deep concrete settling basin structure (20'x20' flat bottom with 3' walls on 2 sides, 10:1 ramps on other sides, 50'x50' overall footprint) and weeping wall/picket structure or outlet control) constructed at the outlet of a open feedlot. Removes a portion of the solids that otherwise would leave with the runoff from an animal feeding operation. Part of an animal waste management system.

Scenario Feature Measure: Cubic Foot of Total Storage

Scenario Unit: Cubic Foot

Scenario Typical Size: 3,900

Scenario Cost: \$11,931.83

Scenario Cost/Unit: \$3.06

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$128.74	33	\$4,248.42
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	\$406.76	12	\$4,881.12
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.19	50	\$209.50
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	\$2.25	50	\$112.50
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	\$20.81	8	\$166.48
Materials						
Weeping Wall	1765	Weeping wall or picket screen structure for solid settling basin. Materials only.	Foot	\$52.98	15	\$794.70
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$29.01	38	\$1,102.38
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	\$167.58	1	\$167.58
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 632 - Waste Separation Facility

Scenario: #3 - 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 Recycling (633), 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 with 18" walls on each side.) 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.

Scenario Feature Measure: Square Foot of Settling Lane Footprint

Scenario Unit: Square Foot

Scenario Typical Size: 5,000

Scenario Cost: \$25,241.97

Scenario Cost/Unit: \$5.05

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$128.74	78	\$10,041.72
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.19	90	\$377.10
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	\$406.76	30	\$12,202.80
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	\$2.25	180	\$405.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$29.01	62	\$1,798.62
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	\$167.58	1	\$167.58
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 632 - Waste Separation Facility

Scenario: #4 - Gravity Tank

Scenario Description:

A concrete tank used for gravity separation of solid material in a dairy waste management system. The waste management system must utilize a "flush" type system in order to convey and agitate the material. The flush system is needed to maintain high solids removal. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), 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:

A concrete tank 20' x 20' x 6' with a full width ramp of 20' x 72'. For a total structure capacity of 6,720 cu ft. Separator description: Dairy manure is flushed into the Gravity Tank (Pull Plug) Separator that utilizes a vertical pipe, surrounded by a baffle, that is open at the top. The vertical pipe maintains 4.5 feet of material in the tank. When the manure is flushed into the tank the level rises in the tank and slowly drains through the baffle, floating mat of fibrous material (roughage from the dairy manure) and the open top of the vertical pipe as the level returns to 4.5 feet. The liquid goes to a storage structure.

This process is repeated each time the manure is flushed into the tank, typically 2 times per day. The floating material will form a mat on the surface of the separator, the heavy material will sink to the bottom of the separator. Eventually the floating mat and the heavy material will meet and the tank level will not return to 4.5 feet. The basin will continue to be used a few more weeks. This helps to dewater the separated solids. When the separator is ready to be cleaned out the vertical pipe (Pull Plug) is removed and the basin dewatered for 12 to 24 hours. The solids are removed. The vertical pipe installed and the process starts again.

Scenario Feature Measure: Total capacity of basin

Scenario Unit: Cubic Foot

Scenario Typical Size: 6,720

Scenario Cost: \$25,325.58

Scenario Cost/Unit: \$3.77

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.25	250	\$562.50
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	\$128.74	20	\$2,574.80
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	\$406.76	50	\$20,338.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$29.01	42	\$1,218.42
Pipe, PVC, 6", SDR 35	993	Materials: - 6" - PVC - SDR 35 - ASTM D3034	Foot	\$3.71	36	\$133.56
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	2	\$498.30

Practice: 634 - Waste Transfer

Scenario: #1 - Manure Auger

Scenario Description:

Scenario is for a manure auger associated with an agricultural production operation to transfer agricultural waste product from the storage facility to manure spreading equipment for proper utilization. This auger is used when the manure consistency will not allow for pumping. Payment includes the cost of the auger and labor for the electrical hook-up.

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 an 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 an auger to remove manure from an animal waste storage structure and facilitate the transfer of this material to the next step of waste treatment or utilization. This auger is for a tank less than 14' deep and is part of an animal waste management system to address water quality concerns.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 632, Waste Separation Facility; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling

Scenario Feature Measure: Auger, installed

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$5,584.18

Scenario Cost/Unit: \$5,584.18

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$31.19	12	\$374.28
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	\$4,960.75	1	\$4,960.75
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 634 - Waste Transfer

Scenario: #2 - Wastewater catch basin, less than 1000 gal.

Scenario Description:

Installation of 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 be transferred from the collection basin to a waste storage facility. Payment 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 associated practice 533 Pumping Plant.

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 waste management system able 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 wastewater transfer is less than 1000 gallons of contaminated liquid that may flow from silage bunkers or animal production facilities. 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.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Waste Separation Facility; 590 Nutrient Management for waste application; 633, Waste Recycling.

Scenario Feature Measure: Collection volume installed

Scenario Unit: Gallon

Scenario Typical Size: 1,000

Scenario Cost: \$5,354.97

Scenario Cost/Unit: \$5.35

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$128.74	4	\$514.96
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$17.45	2	\$34.90
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	\$53.21	4	\$212.84
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.49	4	\$261.96
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$54.57	8	\$436.56
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	\$406.76	2	\$813.52
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	\$20.81	8	\$166.48
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	\$29.64	12	\$355.68

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	4	\$95.44
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Materials

Catch Basin, concrete, 60" dia.	1754	Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only.	Each	\$1,945.90	1	\$1,945.90
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	\$20.00	5	\$100.00

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15
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	\$167.58	1	\$167.58

Practice: 634 - Waste Transfer

Scenario: #3 - Concrete Channel, with footers

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 a 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.

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 5" 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 a collection basin or waste storage facility.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Waste Separation Facility; 590 Nutrient Management for waste application; 633, Waste Recycling.

Scenario Feature Measure: Bottom surface area of concrete channel

Scenario Unit: Square Foot

Scenario Typical Size: 1,200

Scenario Cost: \$9,423.07

Scenario Cost/Unit: \$7.85

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$65.49	8	\$523.92
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$17.45	4	\$69.80
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	\$128.74	22	\$2,832.28
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	\$406.76	11	\$4,474.36
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	\$29.64	8	\$237.12
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	\$20.81	16	\$332.96
Materials						
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	\$15.29	12	\$183.48
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	\$20.00	26	\$520.00
Mobilization						

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15
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Practice: 634 - Waste Transfer

Scenario: #4 - Concrete Channel, no footers

Scenario Description:

Installation of a concrete channel that consists of a slab with curb for the entire length of the channel to enable the facility manager to direct liquid waste to a 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.

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 5" thick concrete slab with curbing on each side of the slab that is 2' high, 6" thick for the entire length. The purpose is to transfer liquids or manure slurry from one area to a collection basin or waste storage facility.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Waste Separation Facility; 590 Nutrient Management for waste application; 633, Waste Recycling.

Scenario Feature Measure: Bottom surface area of concrete channel

Scenario Unit: Square Foot

Scenario Typical Size: 1,200

Scenario Cost: \$7,637.09

Scenario Cost/Unit: \$6.36

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$128.74	19	\$2,446.06
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	\$406.76	9	\$3,660.84
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.49	8	\$523.92
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	\$29.64	8	\$237.12
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	\$20.00	26	\$520.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 634 - Waste Transfer

Scenario: #6 - Concrete Channel with push-off wall at pond and safety gate

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 and push off wall to enable the facility manager to direct liquid waste to a collection basin and/or waste storage facility. The purpose is to transfer liquids or manure slurry from one area to a collection basin or waste storage facility. Includes safety gate for human and animal exclusion.

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.

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 5" thick concrete slab with curbing on each side of the slab that is 2' high, 6" thick with footing for the entire length. The push-off ramp is a concrete cantilever structure that allows the waste to be moved into the storage facility.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Waste Separation Facility; 590 Nutrient Management for waste application; 633, Waste Recycling.

Scenario Feature Measure: Bottom surface area of concrete channel

Scenario Unit: Square Foot

Scenario Typical Size: 1,200

Scenario Cost: \$12,275.20

Scenario Cost/Unit: \$10.23

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$128.74	22	\$2,832.28
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$17.45	5	\$87.25
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	\$406.76	17	\$6,914.92
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.49	8	\$523.92
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	\$20.81	32	\$665.92
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	\$29.64	8	\$237.12
Materials						
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	\$15.29	16	\$244.64
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	\$20.00	26	\$520.00

Mobilization

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15
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Practice: 634 - Waste Transfer

Scenario: #7 - Concrete Channel with Drop Chute

Scenario Description:

Installation of a concrete channel that consists of a slab with wall and footing on each side of the slab for the entire length of the channel, in addition to an overfall structure at the channel outlet, to enable the facility manager to direct liquid waste to a 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: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Solid/Liquid Waste Separation Facility; 590 Nutrient Management for waste application; 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'-wide x 12'-long push-off platform having an 8"-thick slab and 4'-high side walls. Push-off platform slab is supported on all four sides by a 6'-high wall with footer. A horizontal concrete beam is installed above the end of the platform to serve as a safety barrier for scraping equipment. Manure scraped off the end of the platform drops vertically onto a 16'-wide x 6"-thick concrete chute installed on the lower half of a 2:1 sideslope of a manure holding pond. The purpose is to transfer manure and runoff from a feedlot area or livestock building to a waste storage facility.

Scenario Feature Measure: Channel with Drop Chute, installed

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$8,017.85

Scenario Cost/Unit: \$8,017.85

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$17.45	5	\$87.25
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	\$54.57	8	\$436.56
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	\$406.76	9.9	\$4,026.92
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	\$128.74	13.7	\$1,763.74
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	\$29.64	8	\$237.12
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	\$20.81	32	\$665.92
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$29.01	19	\$551.19

Mobilization

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15
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Practice: 634 - Waste Transfer

Scenario: #8 - Manure Flush System

Scenario Description:

Installation of a manure flush system consisting of a flushwater storage tank, flushing mechanism such as a valve, and flush water distribution. This practice scenario is suitable only where the water or wastewater supplies are available for operating a flush system to collect the animal waste deposited on the concrete surfaces. Payment includes tank, valve and distribution pipeline, site prep and concrete to support these structures.

This scenario addresses the potential for surface water and groundwater quality degradation from animal waste.

Before Situation:

An animal production facility does not have an efficient method for collecting and transferring the animal waste produced. A source of sufficient water or wastewater resources are available to design a flush system to clean the production floor and collect the waste materials deposited.

After Situation:

The design flush volume for the flush system is less than 1000 gallons. Concrete slab to support the tank and distribution pipeline is 28ft x 12 ft x 5" thick. with 40 ft of above ground 8" pipe is used for distribution.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Waste Separation Facility; 590 Nutrient Management for waste application; 633, Waste Recycling.

Scenario Feature Measure: 1000 Gallons of flush water

Scenario Unit: Gallon

Scenario Typical Size: 1,000

Scenario Cost: \$4,879.68

Scenario Cost/Unit: \$4.88

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$54.57	8	\$436.56
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	\$128.74	5	\$643.70
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$17.45	4	\$69.80
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	8	\$190.88
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	16	\$332.96
Materials						
Tank, Poly enclosed Storage, 300-1000 gal	1074	Water storage tanks. Includes materials and shipping only.	Gallon	\$0.89	1000	\$890.00
Plug Valve, 8"	2101	8" diameter plug valve. Materials only.	Each	\$1,681.43	1	\$1,681.43
Pipe, PVC, 8", SCH 40	981	Materials: - 8" - PVC - SCH 40 - ASTM D1785	Foot	\$9.63	40	\$385.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 634 - Waste Transfer

Scenario: #9 - Wastewater Recycle System for Flush System, Pipes only

Scenario Description:

Installation of a wastewater recycle pipeline utilized with manure and wastewater flush system using recycled wastewater. Scenario is for the pipe system only to retrofit flush systems to utilize recycled water. Payment includes excavation, placement of bedding as needed, conveyance pipelines with valves and pipe backfill to transport water to the flush tank.

This scenario addresses the potential for surface water and groundwater quality degradation from animal waste.

Before Situation:

An animal production facility does not have an efficient method for collecting and transferring the animal waste produced. Wastewater however is available in a sufficient quantity to provide a flush cycle to clean the production floor and collect the waste materials deposited.

After Situation:

Supplemental piping is needed to install the recycled flush water as a means to collect the animal waste deposited on the concrete production surfaces. The pipe design for the flush volume requires 300 feet of 3 inch diameter pipe for pressure flow.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Waste Separation Facility; 590 Nutrient Management for waste application; 633, Waste Recycling.

Scenario Feature Measure: Flush - pipes

Scenario Unit: Feet

Scenario Typical Size: 300

Scenario Cost: \$2,823.15

Scenario Cost/Unit: \$9.41

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.33	300	\$399.00
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$54.57	12	\$654.84
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	12	\$286.32
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	8	\$166.48
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$28.63	11	\$314.93
Pipe, PVC, 3", SCH 40	977	Materials: - 3" - PVC - SCH 40 - ASTM D1785	Foot	\$2.78	300	\$834.00
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	\$167.58	1	\$167.58

Practice: 634 - Waste Transfer

Scenario: #10 - 8 inch PVC pipeline, gravity or low pressure flow

Scenario Description:

Gravity or low pressure flow pipeline used to transfer manure or wastewater according to the CNMP. Payment includes the pipe plus clean-out risers and fittings, trench excavation and backfill, labor and equipment for installation. Typical installation applies to soils with no special bedding requirements.

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.

Before Situation:

There is a need to transport manure or wastewater within a waste management system.

After Situation:

Install a 100 foot long 8 inch diameter PVC gasketed IPS pipe to transfer the manure wastewater. The transfer pipeline will deliver the manure slurry according to the CNMP, thereby protecting water quality resources.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Waste Separation Facility; 590 Nutrient Management for waste application; 633, Waste Recycling; 635, Vegetated Treatment Area.

Scenario Feature Measure: Length of pipe installed

Scenario Unit: Feet

Scenario Typical Size: 100

Scenario Cost: \$1,509.54

Scenario Cost/Unit: \$15.10

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.51	8	\$44.08
Trenching, Earth, loam, 24" x 48"	54	Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$3.00	100	\$300.00
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	\$20.81	16	\$332.96
Materials						
Pipe, PVC, 8", SDR 35	994	Materials: - 8" - PVC - SDR 35 - ASTM D3034	Foot	\$6.66	125	\$832.50

Practice: 634 - Waste Transfer

Scenario: #11 - Gravity or Low pressure 24 in Dual Wall pipeline.

Scenario Description:

Gravity or low pressure flow pipeline used to transfer manure or wastewater according to the CNMP. Payment includes the pipe plus clean-out risers and fittings, trench excavation and backfill, gravel bedding, labor and equipment for installation.

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.

Before Situation:

There is a need to transport manure or wastewater within a waste management system.

After Situation:

Install a 100 foot long 24 inch diameter dual wall gasketed IPS pipe to transfer the manure wastewater. The transfer pipeline will deliver the manure slurry according to the CNMP, thereby protecting water quality resources.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Waste Separation Facility; 590 Nutrient Management for waste application; 633, Waste Recycling; 635, Vegetated Treatment Area.

Scenario Feature Measure: Length of pipe installed

Scenario Unit: Feet

Scenario Typical Size: 100

Scenario Cost: \$6,401.38

Scenario Cost/Unit: \$64.01

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$185.79	8	\$1,486.32
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	\$20.81	16	\$332.96
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	8	\$190.88
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$29.01	72	\$2,088.72
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	\$18.42	125	\$2,302.50

Practice: 634 - Waste Transfer

Scenario: #12 - PVC Pressure Distribution Pipeline.

Scenario Description:

Pressure flow pipeline used to transfer manure wastewater by pumping from the waste storage pond to the field where it is to be applied according to the CNMP. The pressure pipe moves the water by pumping from the intake riser location, through a buried mainline with outlet risers. Payment includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

This pipeline 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.

Before Situation:

There is a need to transport manure or wastewater within a waste management system. The pressure distribution pipeline is utilized in the land application aspect of the operation.

After Situation:

Install a 2000 foot long 8 inch diameter PVC gasketed IPS pipe that has an SDR of 21 and is water tight under pressure flow to transfer the manure wastewater. An inlet riser and is located near the pump site of the waste storage pond and designed for the desired pressure and flow for the application system. The transfer pipeline will deliver the manure slurry to the fields for agronomic nutrient utilization according to the CNMP, thereby protecting water quality resources.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Waste Separation Facility; 590 Nutrient Management for waste application; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.

Scenario Feature Measure: Length of pipe installed

Scenario Unit: Feet

Scenario Typical Size: 2,000

Scenario Cost: \$32,095.81

Scenario Cost/Unit: \$16.05

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$3.00	2000	\$6,000.00
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	\$128.74	4	\$514.96
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.51	180	\$991.80
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	\$20.81	80	\$1,664.80
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	\$38.65	20	\$773.00
Materials						
Valve, sprinkler hydrant irrigation valve with riser, metal, 8" x 4" x 42"	2104	Irrigation hydrant valve assembly including saddle tee, coated metal riser and integral valve installed on a 8" dia. pipeline, 4" dia. X 42" long riser. Materials only.	Each	\$309.16	7	\$2,164.12
Valve, Pressure Relief	1042	Materials for <2" Pressure Relief Valve	Each	\$169.16	1	\$169.16
Plug Valve, 8"	2101	8" diameter plug valve. Materials only.	Each	\$1,681.43	1	\$1,681.43
Valve, Air Vacuum Release, Continuous	1106	Materials for <2" Automatic Air/Vacuum Relief Valve (3 - Way Air Vac)	Each	\$152.18	3	\$456.54

Materials

Pipe, PVC, 8", SDR 26	991	Materials: - 8" - PVC - SDR 26 160 psi - ASTM D2241	Foot	\$8.84	2000	\$17,680.00
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Practice: 634 - Waste Transfer

Scenario: #13 - Agitator, small, < 10 ft deep reception pit

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. Payment includes cost of the agitator equipment materials and labor for the electrical hook-up. Payment does not include a pump.

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.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling

Scenario Feature Measure: Agitator for wastewater, installed

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$11,621.41

Scenario Cost/Unit: \$11,621.41

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$31.19	11	\$343.09
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	\$11,209.52	1	\$11,209.52
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	\$68.80	1	\$68.80

Practice: 634 - Waste Transfer

Scenario: #14 - Agitator, medium, 10 ft to 15 ft deep reception pit

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 10 to 15 feet deep. Payment includes cost of the agitator equipment materials and labor for the electrical hook-up. Payment does not include a pump.

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.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling

Scenario Feature Measure: Agitator for wastewater, installed

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$17,865.67

Scenario Cost/Unit: \$17,865.67

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$31.19	12	\$374.28
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	\$17,323.81	1	\$17,323.81
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	\$167.58	1	\$167.58

Practice: 634 - Waste Transfer

Scenario: #15 - Agitator, large, > 15 ft deep reception pit

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 than 15 feet deep. Payment includes cost of the agitator equipment materials and labor for the electrical hook-up. Payment does not include a pump.

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.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling

Scenario Feature Measure: Agitator for wastewater, installed

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$26,099.62

Scenario Cost/Unit: \$26,099.62

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$31.19	12	\$374.28
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	\$25,476.19	1	\$25,476.19
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 634 - Waste Transfer

Scenario: #16 - Waste hauling Solid, < 2 miles

Scenario Description:

This scenario describes hauling of animal manure to agricultural land for final utilization. This scenario can only be used for distances up to 150 miles. It is intended to be used in high risk water quality drainage areas or when soil test phosphorus exceeds the allowable limit on fields that have typically been used for manure application. This waste transfer payment is intended to offset additional costs associated with hauling the manure out of the high risk drainage area or transported a longer distance to fields with low soil test phosphorus. Limits of soil test phosphorus for contracting purposes need to meet acceptable state criteria.

This practice scenario addresses the water quality concerns for excessive nutrients or degradation of water resources from over application of manure on local fields.

Before Situation:

The local drainage area is at high risk for phosphorus leaving the fields in the runoff solution and further manure waste application will likely cause water quality degradation.

After Situation:

Trucks are loaded with 6.3 tons of manure solids an average of 2 miles outside of the high risk drainage area to a location where phosphorus levels are in the low risk category according to the PhosphorusRisk index for leaving the fields. Waste is transferred out of the critical drainage area for use as fertilizer on crops and pasture land.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling and Concrete channel and Transfer conduit scenario 634 - Waste Transfer.

Scenario Feature Measure: Ton of Waste Hauled

Scenario Unit: Ton

Scenario Typical Size: 6

Scenario Cost: \$16.07

Scenario Cost/Unit: \$2.68

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<i>Equipment/Installation</i>						
Manure Hauling, solid manure, transportation	2031	Transportation cost of hauling solid manure. Trucking costs based on tons hauled times miles. Includes equipment, power unit and labor. Does not include costs for loading or unloading.	Ton-Mile	\$0.12	12.6	\$1.51
Manure Hauling, Solid manure, loading costs	2277	Base cost of solid manure hauling. Includes loading and equipment preparation costs. Use in conjunction with transportation component to determine total cost. Includes equipment, power unit and labor.	Ton	\$2.31	6.3	\$14.55

Practice: 634 - Waste Transfer

Scenario: #17 - Waste hauling Solid, 2-5 miles

Scenario Description:

This scenario describes hauling of animal manure to agricultural land for final utilization. This scenario can only be used for distances up to 150 miles. It is intended to be used in high risk water quality drainage areas or when soil test phosphorus exceeds the allowable limit on fields that have typically been used for manure application. This waste transfer payment is intended to offset additional costs associated with hauling the manure out of the high risk drainage area or transported a longer distance to fields with low soil test phosphorus. Limits of soil test phosphorus for contracting purposes need to meet acceptable state criteria.

This practice scenario addresses the water quality concerns for excessive nutrients or degradation of water resources from over application of manure on local fields.

Before Situation:

The local drainage area is at high risk for phosphorus leaving the fields in the runoff solution and further manure waste application will likely cause water quality degradation.

After Situation:

Trucks are loaded with 6.3 tons of manure solids an average of 5 miles outside of the high risk drainage area to a location where phosphorus levels are in the low risk category according to the PhosphorusRisk index for leaving the fields. Waste is transferred out of the critical drainage area for use as fertilizer on crops and pasture land.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling and Concrete channel and Transfer conduit scenario 634 - Waste Transfer.

Scenario Feature Measure: Ton of Waste Hauled

Scenario Unit: Ton

Scenario Typical Size: 6

Scenario Cost: \$18.33

Scenario Cost/Unit: \$3.06

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<i>Equipment/Installation</i>						
Manure Hauling, solid manure, transportation	2031	Transportation cost of hauling solid manure. Trucking costs based on tons hauled times miles. Includes equipment, power unit and labor. Does not include costs for loading or unloading.	Ton-Mile	\$0.12	31.5	\$3.78
Manure Hauling, Solid manure, loading costs	2277	Base cost of solid manure hauling. Includes loading and equipment preparation costs. Use in conjunction with transportation component to determine total cost. Includes equipment, power unit and labor.	Ton	\$2.31	6.3	\$14.55

Practice: 634 - Waste Transfer

Scenario: #18 - Waste hauling Solid, 5-10 miles

Scenario Description:

This scenario describes hauling of animal manure to agricultural land for final utilization. This scenario can only be used for distances up to 150 miles. It is intended to be used in high risk water quality drainage areas or when soil test phosphorus exceeds the allowable limit on fields that have typically been used for manure application. This waste transfer payment is intended to offset additional costs associated with hauling the manure out of the high risk drainage area or transported a longer distance to fields with low soil test phosphorus. Limits of soil test phosphorus for contracting purposes need to meet acceptable state criteria.

This practice scenario addresses the water quality concerns for excessive nutrients or degradation of water resources from over application of manure on local fields.

Before Situation:

The local drainage area is at high risk for phosphorus leaving the fields in the runoff solution and further manure waste application will likely cause water quality degradation.

After Situation:

Trucks are loaded with 6.3 tons of manure solids an average of 10 miles outside of the high risk drainage area to a location where phosphorus levels are in the low risk category according to the PhosphorusRisk index for leaving the fields. Waste is transferred out of the critical drainage area for use as fertilizer on crops and pasture land.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling and Concrete channel and Transfer conduit scenario 634 - Waste Transfer.

Scenario Feature Measure: Ton of Waste Hauled

Scenario Unit: Ton

Scenario Typical Size: 6

Scenario Cost: \$22.11

Scenario Cost/Unit: \$3.69

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<i>Equipment/Installation</i>						
Manure Hauling, Solid manure, loading costs	2277	Base cost of solid manure hauling. Includes loading and equipment preparation costs. Use in conjunction with transportation component to determine total cost. Includes equipment, power unit and labor.	Ton	\$2.31	6.3	\$14.55
Manure Hauling, solid manure, transportation	2031	Transportation cost of hauling solid manure. Trucking costs based on tons hauled times miles. Includes equipment, power unit and labor. Does not include costs for loading or unloading.	Ton-Mile	\$0.12	63	\$7.56

Practice: 634 - Waste Transfer

Scenario: #19 - Waste hauling Solid, > 10 miles

Scenario Description:

This scenario describes hauling of animal manure to agricultural land for final utilization. This scenario can only be used for distances up to 150 miles. It is intended to be used in high risk water quality drainage areas or when soil test phosphorus exceeds the allowable limit on fields that have typically been used for manure application. This waste transfer payment is intended to offset additional costs associated with hauling the manure out of the high risk drainage area or transported a longer distance to fields with low soil test phosphorus. Limits of soil test phosphorus for contracting purposes need to meet acceptable state criteria.

This practice scenario addresses the water quality concerns for excessive nutrients or degradation of water resources from over application of manure on local fields.

Before Situation:

The local drainage area is at high risk for phosphorus leaving the fields in the runoff solution and further manure waste application will likely cause water quality degradation.

After Situation:

Trucks are loaded with 6.3 tons of manure solids and hauled an average of 20 miles outside of the high risk drainage area to a location where phosphorus levels are in the low risk category according to the PhosphorusRisk index for leaving the fields. Waste is transferred out of the critical drainage area for use as fertilizer on crops and pasture land.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling and Concrete channel and Transfer conduit scenario 634 - Waste Transfer.

Scenario Feature Measure: Ton of Waste Hauled

Scenario Unit: Ton

Scenario Typical Size: 6

Scenario Cost: \$29.67

Scenario Cost/Unit: \$4.95

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<i>Equipment/Installation</i>						
Manure Hauling, Solid manure, loading costs	2277	Base cost of solid manure hauling. Includes loading and equipment preparation costs. Use in conjunction with transportation component to determine total cost. Includes equipment, power unit and labor.	Ton	\$2.31	6.3	\$14.55
Manure Hauling, solid manure, transportation	2031	Transportation cost of hauling solid manure. Trucking costs based on tons hauled times miles. Includes equipment, power unit and labor. Does not include costs for loading or unloading.	Ton-Mile	\$0.12	126	\$15.12

Practice: 634 - Waste Transfer

Scenario: #20 - Waste Hauling, Liquid

Scenario Description:

This scenario describes hauling of animal manure to agricultural land for final utilization. This scenario can only be used for distances up to 150 miles. It is intended to be used in high risk water quality drainage areas or when soil test phosphorus exceeds the allowable limit on fields that have typically been used for manure application. This waste transfer payment is intended to offset additional costs associated with hauling the manure out of the high risk drainage area or transported a longer distance to fields with low soil test phosphorus. Limits of soil test phosphorus for contracting purposes need to meet acceptable state criteria.

This practice scenario addresses the water quality concerns for excessive nutrients or degradation of water resources from over application of manure on local fields.

Before Situation:

The local drainage area is at high risk for phosphorus leaving the fields in the runoff solution and further manure waste application will likely cause water quality degradation.

After Situation:

Trucks are loaded with 6000 gallons of manure solids and hauled an average of 20 miles outside of the high risk drainage area to a location where phosphorus levels are in the low risk category according to the PhosphorusRisk index for leaving the fields. Waste is transferred out of the critical drainage area for use as fertilizer on crops and pasture land.

Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; PS 633, Waste Recycling.

Scenario Feature Measure: Gallon of waste hauled

Scenario Unit: Gallon

Scenario Typical Size: 6,000

Scenario Cost: \$60.00

Scenario Cost/Unit: \$0.01

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<i>Equipment/Installation</i>						
Manure Hauling, Liquid manure, transportation	1771	Transportation cost of hauling liquid manure. Trucking costs based on gallons hauled times miles. Includes equipment, power unit and labor. Does not include costs for loading or unloading.	Gallon-Mile	\$0.00	120000	\$60.00

Practice: 635 - Vegetated Treatment Area

Scenario: #1 - VTA-Constructed Vegetative Area with Flow Distribution

Scenario Description:

This is a permanent herbaceous vegetative area installed near livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled gravity outflow or is pumped into distribution piping within 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), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

Before Situation:

Nutrient rich wastewater is running off from or directly discharging from an animal operation that has the potential to pollute surface waters or pond 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) ond/or Waste Storage Facility (313) could be contracted to provide pre-treatment/ storage 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.

Scenario Feature Measure: Amount of VTA installed

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$7,388.78

Scenario Cost/Unit: \$7,388.78

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.38	400	\$952.00
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	\$2.25	70	\$157.50
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.49	16	\$1,047.84
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	\$29.64	16	\$474.24
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	20	\$416.20
Materials						
Coupling, PVC, endcap, 2", SCH 20	1727	2" - PVC- SCH 40- ASTM D1785 pipe endcaps. Materials only.	Each	\$1.81	15	\$27.15
Pipe, PVC, 2", SCH 40	976	Materials: - 2" - PVC - SCH 40 - ASTM D1785	Foot	\$1.36	45	\$61.20
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$29.01	70	\$2,030.70
Pipe, PE, 6", DR 9, perforated	1728	Materials: -6" - Perforated PE- 160 psi - ASTM D3035 DR 9	Foot	\$23.80	80	\$1,904.00
Mobilization						

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	\$68.80	1	\$68.80
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 635 - Vegetated Treatment Area

Scenario: #2 - VTA-Constructed with 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), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), 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.

Scenario Feature Measure: Amount of VTA installed

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$2,104.19

Scenario Cost/Unit: \$2,104.19

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$65.49	16	\$1,047.84
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	\$29.64	16	\$474.24
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	16	\$332.96
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 635 - Vegetated Treatment Area

Scenario: #3 - VTA using an Existing Vegetative Area with Flow Distribution

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), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), 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 trenches 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.

Scenario Feature Measure: Amount of VTA treating wastewater

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$9,372.43

Scenario Cost/Unit: \$9,372.43

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.25	75	\$168.75
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	\$406.76	7	\$2,847.32
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.38	445	\$1,059.10
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	\$20.81	16	\$332.96
Materials						
Coupling, PVC, endcap, 2", SCH 20	1727	2" - PVC- SCH 40- ASTM D1785 pipe endcaps. Materials only.	Each	\$1.81	20	\$36.20
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$29.01	75	\$2,175.75
Pipe, PVC, 2", SCH 40	976	Materials: - 2" - PVC - SCH 40 - ASTM D1785	Foot	\$1.36	40	\$54.40
Pipe, PE, 6", DR 9, perforated	1728	Materials: -6" - Perforated PE- 160 psi - ASTM D3035 DR 9	Foot	\$23.80	100	\$2,380.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

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	\$68.80	1	\$68.80
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Practice: 638 - Water & Sediment Control Basin

Scenario: #1 - Base

Scenario Description:

Typical scenario for the construction of an earthen embankment or the rebuild of an existing WASC OB. Rebuild work includes the removal of accumulated sediment from the pool area to restore original capacity. Outlet is typically an underground outlet. An earthen embankment or combination ridge and channel generally constructed/rebuilt 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. 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.

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 concerns addressed include soil erosion and water quality by trapping sediment and/or reducing 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 or rebuilt by the excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: CY of WASC OB Embankment

Scenario Unit: Cubic Yard

Scenario Typical Size: 700

Scenario Cost: \$1,953.80

Scenario Cost/Unit: \$2.79

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.38	700	\$1,666.00
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	\$38.65	1	\$38.65
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 638 - Water & Sediment Control Basin

Scenario: #2 - Topsoil

Scenario Description:

Typical scenarios for the construction of an earthen embankment or the rebuild of an existing WASCOB. Prior to constructing/reconstructing 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/rebuilt 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 Basis is constructed or rebuilt by the excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: CY of WASCOB Embankment

Scenario Unit: Cubic Yard

Scenario Typical Size: 700

Scenario Cost: \$2,161.30

Scenario Cost/Unit: \$3.09

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$0.83	250	\$207.50
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	\$2.38	700	\$1,666.00
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	\$38.65	1	\$38.65
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 638 - Water & Sediment Control Basin

Scenario: #3 - Narrow Base

Scenario Description:

Typical scenario for the construction of an earthen WASCOB. 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. The typical installation includes a WASCOB system with 2.5' ridge height, 6' top width, and 2.5:1 front and back slopes. The finished WASCOB system measures 1,800 feet (6 WASCOBs at 300' each) in a field with slopes from 2% to 8% constructed in loam soils or similar in regards to workability. 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. 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.

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 concerns addressed include soil erosion and water quality by trapping sediment and/or reducing 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:

A system of six (6) Water and Sediment Control Basins are constructed measuring 1,800 feet in length, 2.5' height, 6' top width with 2.5:1 front and 2.5:1 back slopes. Excavation/earthfill conducted with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: Length of embankment

Scenario Unit: Foot

Scenario Typical Size: 1,800

Scenario Cost: \$4,182.05

Scenario Cost/Unit: \$2.32

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.38	1620	\$3,855.60
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	\$38.65	2	\$77.30
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 638 - Water & Sediment Control Basin

Scenario: #4 - Farmable

Scenario Description:

Typical scenario for the construction of an earthen WASC OB. 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. The typical installation includes a broadbased WASC OB system consisting of 6 WASC OBs in series having a 6' top width, 7.5:1 upstream and 7.5:1 downstream slopes. The finished WASC OB system measures 1,800 feet (6 WASC OBs at 300' each) in a field with slopes from 2% to 8% constructed in loam soils or similar in regards to workability. WASC OB area is farmed. 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. 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.

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 concerns addressed include soil erosion and water quality by trapping sediment and/or reducing 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:

A series of six (6) Water and Sediment Control Basins are constructed measuring 1,800 feet in length, 2.5' height, 6' top width, with 7.5:1 front and back slopes. Excavation/earthfill conducted with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: Length of embankment

Scenario Unit: Foot

Scenario Typical Size: 1,800

Scenario Cost: \$10,230.20

Scenario Cost/Unit: \$5.68

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.38	4145	\$9,865.10
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	\$38.65	3	\$115.95
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 638 - Water & Sediment Control Basin

Scenario: #5 - Base, crop seasonal construction

Scenario Description:

Typical scenario for the construction of an earthen embankment or the rebuild of an existing WASC OB. Rebuild work includes the removal of accumulated sediment from the pool area to restore original capacity. Outlet is typically an underground outlet. An earthen embankment or combination ridge and channel generally constructed/rebuilt 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. 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. Foregone income reflects entire construction area to account for crop loss while constructing during the growing season.

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 concerns addressed include soil erosion and water quality by trapping sediment and/or reducing 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 or rebuilt by the excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: CY of WASC OB Embankment

Scenario Unit: Cubic Yard

Scenario Typical Size: 700

Scenario Cost: \$2,387.90

Scenario Cost/Unit: \$3.41

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.38	700	\$1,666.00
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	0.5	\$218.88
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	0.5	\$215.22
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	\$38.65	1	\$38.65
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 638 - Water & Sediment Control Basin

Scenario: #6 - Topsoil, crop seasonal construction

Scenario Description:

Typical scenarios for the construction of an earthen embankment or the rebuild of an existing WASCOB. Prior to constructing/reconstructing 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/rebuilt 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. Foregone income reflects entire construction area to account for crop loss while constructing during the growing season.

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 Basis is constructed or rebuilt by the excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: CY of WASCOB Embankment

Scenario Unit: Cubic Yard

Scenario Typical Size: 700

Scenario Cost: \$2,595.40

Scenario Cost/Unit: \$3.71

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$0.83	250	\$207.50
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	\$2.38	700	\$1,666.00
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	0.5	\$215.22
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	0.5	\$218.88
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	\$38.65	1	\$38.65
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 642 - Water Well

Scenario: #2 - Shallow Drilled Well, ≤ 100 feet, ≤ 6in Diam

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface, and the flow is such that a smaller diameter well is sufficient. 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.

Before Situation:

Livestock have insufficient water or are fenced from their water source.

After Situation:

An average well depth is 100 feet. Well casings are ≤ 6" in diameter. 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.

Scenario Feature Measure: Depth of Well

Scenario Unit: Linear Foot

Scenario Typical Size: 100

Scenario Cost: \$3,753.37

Scenario Cost/Unit: \$37.53

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	\$176.27	10	\$1,762.70
Materials						
Well Casing, Plastic, 6"	1804	PVC or ABS non-threaded well casing, 6". Materials only.	Foot	\$6.46	70	\$452.20
Well Cap, 6"	1786	Well cap, 6". Materials only.	Each	\$33.29	1	\$33.29
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite grout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	\$768.14	1	\$768.14
Well Screen, plastic, 6"	1999	6" PVC well screen. Materials only.	Foot	\$16.17	30	\$485.10
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.79	1	\$2.79
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 642 - Water Well

Scenario: #3 - Shallow Drilled Well, ≤ 100 feet, > 6in Diam

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface, and the flow is such that a largerr diameter well is needed. 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.

Before Situation:

Livestock have insufficient water or are fenced from their water source.

After Situation:

An average well depth is 100 feet. Well casings are 12" in diameter. 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 construciton activities.

Scenario Feature Measure: Depth of Well

Scenario Unit: Linear Foot

Scenario Typical Size: 100

Scenario Cost: \$4,828.03

Scenario Cost/Unit: \$48.28

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	\$176.27	10	\$1,762.70
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	\$768.14	1	\$768.14
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.79	1	\$2.79
Well Cap, 12"	1789	Well cap, 12". Materials only.	Each	\$112.25	1	\$112.25
Well Casing, Plastic, 12"	1807	PVC or ABS non-threaded well casing, 12". Materials only.	Foot	\$16.72	70	\$1,170.40
Well Screen, plastic, 8"	2000	8" PVC well screen. Materials only.	Foot	\$25.42	30	\$762.60
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 642 - Water Well

Scenario: #4 - Deep Drilled Well, > 100 Feet

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur >100 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.

Before Situation:

Livestock have insufficient water or are fenced from their water source.

After Situation:

An average well depth is 300 feet. Well casings are 4-6" in diameter. Well is dug into consolidated (bedrock or firm material) where casing and lining is installed to a depth of 240 feet. The remaining depth does not need lining or screening due to the "open hole" construction and nature of wells in this substrate. 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.

Scenario Feature Measure: Depth of Well

Scenario Unit: Linear Foot

Scenario Typical Size: 300

Scenario Cost: \$8,646.25

Scenario Cost/Unit: \$28.82

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	\$176.27	24	\$4,230.48
Materials						
Well Casing, Metal, 6"	1810	Steel well casing, 6". Materials only.	Foot	\$14.01	240	\$3,362.40
Well Cap, 6"	1786	Well cap, 6". Materials only.	Each	\$33.29	1	\$33.29
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	\$768.14	1	\$768.14
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.79	1	\$2.79
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #2 - 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 native plant conditions (T&E plants) or wildlife have been identified as the resource concern, 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 8 hours labor per year.

Before Situation:

Rare or declining habitat is deficient due to the absence of annual monitoring and adaptive management actions of low intensity and complexity.

After Situation:

Rare and declining habitat is improved by implementation of annual adaptive management actions of low intensity and complexity.

Scenario Feature Measure: Monitoring efforts and adaptive management actions

Scenario Unit: Acre

Scenario Typical Size: 160

Scenario Cost: \$630.45

Scenario Cost/Unit: \$3.94

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.13	1	\$6.13
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.22	1.5	\$54.33
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	\$45.96	1	\$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	\$20.81	7	\$145.67
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	\$94.59	4	\$378.36

Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #5 - Development of Shallow Micro-Topographic Features with Normal Farming Equipment.

Scenario Description:

This typical scenario is installed on open non-wetlands. The purpose is to increase plant species richness and diversity, create micro-habitats for invertebrates, increase water infiltration and reduce run-off. The area is plowed to loosen the soil. Then the soil is excavated with normal farming equipment (e.g. tractor and box-blade) to a depth of 2-6 inches and immediately deposited. This lowering and raising of a box-blade restores the original micro-topographic features (6' X 6' depressions and mounds) common to most landscapes and landforms prior to clearing, tilling, and annual mowing. Restoration of shallow but frequent micro-topographic features has been lost by the smoothing action of tillage, mowing and the original land-clearing. This scenario is typically implemented for ecosystem restoration projects such as prairie restoration and range-land restoration, and particularly on moderately well-drained soils.

Before Situation:

Micro-topographic features have been eliminated by past conversion to agriculture and/or past cultural practices. This has resulted in the lack of micro-soil moisture gradients within the field. The opportunity for plant species richness and diversity is minimal. Water storage potential is absent. Water rapidly runs off the field after rains and snow melt, carrying nutrients, solids and surface organic materials. No micro-ponding sites are available for invertebrate use.

After Situation:

Shallow micro-depressions and mounds are numerous. This varied micro-topographic features provided varied moisture gradients required for high plant species richness and diversity. Wildlife habitat is improved. Water conservation is increased, increasing vegetative production. Water quality is improved as the micro depressions capture sediments, nutrients and manure. Over time, the micro-depressions become more nutrient rich than the micro-highs, further increasing plant species richness.

Scenario Feature Measure: hours of tractor use

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: \$768.62

Scenario Cost/Unit: \$38.43

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$53.21	6	\$319.26
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	\$15.31	20	\$306.20
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	6	\$143.16

Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #6 - Development of Deep Micro-Topographic Features with Heavy Equipment.

Scenario Description:

This typical scenario is installed on open non-wetlands, where micro-topographic features have been removed by past farming and/or ranching cultural practices. The purpose is to increase plant species richness and diversity, create micro-habitats for invertebrates, increase water infiltration and reduce run-off. The area is plowed 2 weeks prior to excavation to kill existing vegetation and allow for proper dirt work. Then the soil is excavated with track equipment (dozer) to a depth of 6-12 inches and immediately deposited. This lowering and raising of a dozer -blade restores the original deep micro-topographic features (10' X10' depressions and mounds) common to many landscapes and landforms prior to the lands conversion to agricultural lands. This scenario is typically implemented for ecosystem restoration projects such as wetland restoration (herbaceous or prior to planting of woody species), prairie restoration and range-land restoration. It is most commonly applied to well-drained soils as the purpose is for the micro-depression to pond water for short duration (less than 7 days).

Before Situation:

Micro-topographic features have been eliminated by past conversion to agriculture and/or past cultural practices. This has resulted in the lack of micro-soil moisture gradients within the field. The opportunity for plant species richness and diversity is minimal. Water storage potential is absent. Water rapidly runs off the field after rains and snow melt, carrying nutrients, solids and surface organic materials. No micro-ponding sites are available aquatic dependent invertebrates. Vertebrate wildlife habitat is lacking diversity.

After Situation:

Deep (6" - 12" depth) micro-depressions and mounds are numerous. These varied micro-topographic features provide varied moisture gradients required for development of high plant species richness and diversity. Wildlife habitat is improved. Water conservation is increased, increasing vegetative production. Water quality is improved as the deep micro-depressions capture sediments, nutrients and manure. Over time, the micro-depressions become more nutrient rich than the micro-highs, further increasing plant species richness.

Scenario Feature Measure: Hours

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: \$2,109.04

Scenario Cost/Unit: \$105.45

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	\$15.31	20	\$306.20
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	\$181.67	6	\$1,090.02
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	\$29.64	8	\$237.12
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	\$475.70	1	\$475.70

Practice: 644 - Wetland Wildlife Habitat Management

Scenario: #2 - Wetland Wildlife Habitat Monitoring and Management, Low Intensity and Complexity

Scenario Description:

This scenario is applied to wetlands on 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 8 hours labor per year.

Before Situation:

Wetland wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of low intensity and complexity.

After Situation:

Wildlife habitat is improved by implementation of annual adaptive management actions of low intensity and complexity.

Scenario Feature Measure: Monitoring efforts and adaptive management actions

Scenario Unit: Acre

Scenario Typical Size: 160

Scenario Cost: \$630.45

Scenario Cost/Unit: \$3.94

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.13	1	\$6.13
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	\$45.96	1	\$45.96
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.22	1.5	\$54.33
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	\$94.59	4	\$378.36
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	7	\$145.67

Practice: 644 - Wetland Wildlife Habitat Management

Scenario: #5 - Development of Shallow Micro-Topographic Features with Normal Farming Equipment.

Scenario Description:

This typical scenario is installed on non-forested wetlands, including openlands prior to tree planting. The purpose is to increase plant species richness and diversity, create micro-habitats for invertebrates, increase water infiltration and reduce run-off. The area is plowed to loosen the soil. Then the soil is excavated with normal farming equipment (e.g. tractor and box-blade) to a depth of 2-6 inches and immediately deposited. This lowering and raising of a box-blade restores the original micro-topographic features (6' X 6' depressions and mounds) common to most landscapes and landforms prior to clearing, tilling, and annual mowing. Restoration of shallow but frequent micro-topographic features has been lost by the smoothing action of tillage, mowing and the original land-clearing. This scenario is typically implemented for ecosystem restoration projects such as prairie restoration and range-land restoration, and particularly on moderately well-drained soils.

Before Situation:

Micro-topographic features have been eliminated by past conversion to agriculture and/or past cultural practices. This has resulted in the lack of micro-soil moisture gradients within the field. The opportunity for plant species richness and diversity is minimal. Water storage potential is absent. Water rapidly runs off the field after rains and snow melt, carrying nutrients, solids and surface organic materials. No micro-ponding sites are available for invertebrate use.

After Situation:

Shallow micro-depressions and mounds are numerous. This varied micro-topographic features provided varied moisture gradients required for high plant species richness and diversity. Wildlife habitat is improved. Water conservation is increased, increasing vegetative production. Water quality is improved as the micro depressions capture sediments, nutrients and manure. Over time, the micro-depressions become more nutrient rich than the micro-highs, further increasing plant species richness.

Scenario Feature Measure: hours of tractor use

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: \$768.62

Scenario Cost/Unit: \$38.43

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	\$15.31	20	\$306.20
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	\$53.21	6	\$319.26
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	6	\$143.16

Practice: 644 - Wetland Wildlife Habitat Management

Scenario: #6 - Development of Deep Micro-Topographic Features with Heavy Equipment.

Scenario Description:

This typical scenario is installed on non-forested wetlands (or open land prior to tree planting), where micro-topographic features have been removed by past farming and/or ranching cultural practices. The purpose is to increase plant species richness and diversity, create micro-habitats for invertebrates, increase water infiltration and reduce run-off. The area is plowed 2 weeks prior to excavation to kill existing vegetation and allow for proper dirt work. Then the soil is excavated with track equipment (dozer) to a depth of 6-12 inches and immediately deposited. This lowering and raising of a dozer -blade restores the original deep micro-topographic features (10' X10' depressions and mounds) common to many landscapes and landforms prior to the lands conversion to agricultural lands. This scenario is typically implemented for ecosystem restoration projects such as wetland restoration (herbaceous or prior to planting of woody species), prairie restoration and range-land restoration. It is most commonly applied to well-drained soils as the purpose is for the micro-depression to pond water for short duration (less than 7 days).

Before Situation:

Micro-topographic features have been eliminated by past conversion to agriculture and/or past cultural practices. This has resulted in the lack of micro-soil moisture gradients within the field. The opportunity for plant species richness and diversity is minimal. Water storage potential is absent. Water rapidly runs off the field after rains and snow melt, carrying nutrients, solids and surface organic materials. No micro-ponding sites are available aquatic dependent invertebrates. Vertebrate wildlife habitat is lacking diversity.

After Situation:

Deep (6" - 12" depth) micro-depressions and mounds are numerous. These varied micro-topographic features provide varied moisture gradients required for development of high plant species richness and diversity. Wildlife habitat is improved. Water conservation is increased, increasing vegetative production. Water quality is improved as the micro-depressions capture sediments, nutrients and manure. Over time, the micro-depressions become more nutrient rich than the micro-highs, further increasing plant species richness.

Scenario Feature Measure: Hours

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: \$2,109.04

Scenario Cost/Unit: \$105.45

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	\$15.31	20	\$306.20
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	\$181.67	6	\$1,090.02
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	\$29.64	8	\$237.12
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	\$475.70	1	\$475.70

Practice: 644 - Wetland Wildlife Habitat Management

Scenario: #7 - Topographic Feature Creation, Low

Scenario Description:

The setting is all landuses, but typically is on lands used for the production of forest products grazing and/or fish and wildlife where the slope gradient is less than two percent and soils that are not excessively drained. The State-approved habitat evaluation or appraisal found that a limiting factor for wetland wildlife is the absence of sufficient variability in microtopographic relief in the area. The construction of topographic features will provide for diverse soil hydrologic conditions needed to treat the degraded plant condition and/or inadequate habitat for wetland wildlife. Excavated spoil is spread adjacent to excavation or moved to designated locations but not compacted. This scenario is for earthwork, not associated with habitat structures or any other national standard (e.g. Wetland Restoration (657), Wetland Enhancement (659), Wetland Creation (658), and Dike (356)). Facilitating practices may include Structure for Water Control (587).

Before Situation:

The site lacks sufficient micro- and macrotopographic features needed for optimal wetland wildlife habitat for target species. Typically the site has been previously manipulated and utilized for agricultural, livestock or forest production. With the loss of hummocks, depressions and other topographic features scattered throughout the site, both plant and animal species that are dependent on the microenvironments created by these features are no longer present or are in decline within the planning unit.

After Situation:

As a result of the installation, the topographic relief needed to provide the varied wetland wildlife habitat needs is provided.

Scenario Feature Measure: Acres of constructed features

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: \$8,935.38

Scenario Cost/Unit: \$893.54

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Satellite imagery, aerial photography, infrared	966	Infrared imagery	Acre	\$0.16	100	\$16.00
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$121.14	56	\$6,783.84
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	\$29.64	56	\$1,659.84
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	\$475.70	1	\$475.70

Practice: 644 - Wetland Wildlife Habitat Management

Scenario: #8 - Topographic Feature Creation, High

Scenario Description:

The setting is all landuses, but typically is on lands used for the production of forest products grazing and/or fish and wildlife where the slope gradient is less than two percent and soils that are not excessively drained. The State-approved habitat evaluation or appraisal found that a limiting factor for wetland wildlife is the absence of sufficient variability in microtopographic relief in the area. The construction of topographic features will provide for diverse soil hydrologic conditions needed to treat the degraded plant condition and/or inadequate habitat for wetland wildlife. Excavated spoil is needed to further enhance macrotopographic relief by placing and compacting the fill in strategic areas. This scenario is for earthwork, not associated with habitat structures or any other national standard (e.g. Wetland Restoration (657), Wetland Enhancement (659), Wetland Creation (658), and Dike (356)). Facilitating practices may include Structure for Water Control (587).

Before Situation:

The site lacks sufficient micro- and macrotopographic features needed for optimal wetland wildlife habitat for target species. Typically the site has been previously manipulated and utilized for agricultural, livestock or forest production. With the loss of hummocks, depressions and other topographic features scattered throughout the site, both plant and animal species that are dependent on the microenvironments created by these features are no longer present or are in decline within the planning unit.

After Situation:

As a result of the installation, the topographic relief needed to provide the varied wetland wildlife habitat needs is provided.

Scenario Feature Measure: Acres of constructed features

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: \$17,943.88

Scenario Cost/Unit: \$1,794.39

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.19	2150	\$9,008.50
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$121.14	56	\$6,783.84
Satellite imagery, aerial photography, infrared	966	Infrared imagery	Acre	\$0.16	100	\$16.00
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	\$29.64	56	\$1,659.84
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	\$475.70	1	\$475.70

Practice: 644 - Wetland Wildlife Habitat Management

Scenario: #9 - Management and monitoring only, foregone income

Scenario Description:

Site management will include managing/monitoring the site to provide food and cover for wetland wildlife species on cropland. Annual vegetation (crops or other annual vegetation) will be allowed to establish and persist during critical nesting and brood rearing seasons and will remain standing (not harvested) until migratory species have left the site. The setting is on lands used for the production of crops where the slope gradient is less than two percent and soils that are not excessively drained. The State-approved habitat evaluation or appraisal found that a limiting factor for wetland wildlife is the absence of sufficient cover and food in the area. The manipulation of existing cover will be accomplished thru mechanical methods to provide a diverse vegetation mosaic with in and adjacent to the existing wetland addressing inadequate habitat for wetland wildlife. Where this occurs on cropped fields, annual crops will be lost for one growing season (foregone income is included).

Before Situation:

The site lacks sufficient and diverse cover and food needed for optimal wetland wildlife habitat or target species. Typically the site has been previously manipulated and utilized for agricultural. With the loss of abundant and diverse cover and food throughout the site, both plant and animal species that are dependent on these elements are no longer present or are in decline within the planning unit.

After Situation:

Agricultural crop or annual vegetation has been allowed to persist providing needed food and cover essential for identified species. Crops and annual vegetation will not be harvested during the critical seasons as identified by the habitat evaluation. As a result of the installation, adequate habitat needs have been provided.

Scenario Feature Measure: Acres of Wetland Wildlife Cover and Food

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: \$4,494.05

Scenario Cost/Unit: \$449.41

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	\$15.31	10	\$153.10
Foregone Income						
Fl, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	5	\$2,188.80
Fl, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	5	\$2,152.15

Practice: 645 - Upland Wildlife Habitat Management

Scenario: #1 - Macro Topography, deep

Scenario Description:

Establishment of a topographic feature on the landscape consisting of a small dam and pool or small excavated depression that will hold water to provide a source of water for wildlife, including habitat for reptiles and amphibians. Payment includes the equipment and labor associated with establishing the water feature.

Before Situation:

This practice will be installed on any area where seasonal or permanent water for wildlife is inadequate. The resource concerns to be addressed by this practice are inadequate water needed to meet the life needs of the target species or guild. Water storage during the critical period (season) is absent. No micro-ponding sites are available aquatic dependent invertebrates. Vertebrate wildlife habitat is lacking richness.

After Situation:

This practice consists of an excavated depression to collect water for wildlife to access. Excavated depressions are typically 1000 ft2 and 3 feet deep in center with 4:1 side slopes around edge. Associated practices: Critical Area Planting (342), Conservation Cover (327)

Scenario Feature Measure: Each deep macro-topography feature

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$852.27

Scenario Cost/Unit: \$852.27

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$121.14	4	\$484.56
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	\$29.64	4	\$118.56
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 645 - Upland Wildlife Habitat Management

Scenario: #3 - 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 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 8 hours labor per year.

Before Situation:

Wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of low intensity and complexity.

After Situation:

Wildlife habitat is improved by implementation of annual adaptive management actions of low intensity and complexity.

Scenario Feature Measure: Monitoring efforts and adaptive management actions

Scenario Unit: Acre

Scenario Typical Size: 160

Scenario Cost: \$630.45

Scenario Cost/Unit: \$3.94

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$45.96	1	\$45.96
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.13	1	\$6.13
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$36.22	1.5	\$54.33
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	\$20.81	7	\$145.67
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	\$94.59	4	\$378.36

Practice: 645 - Upland Wildlife Habitat Management

Scenario: #6 - Wildlife Habitat Enh w/ FI

Scenario Description:

Exclusion of livestock on 40 acres of pastureland for the enhancement of habitat for wildlife. Monitoring to assure gates are closed and cattle remain excluded during critical nesting period.

Before Situation:

Wildlife habitat is grazed during the primary nesting and development of wildlife species.

After Situation:

Livestock are excluded for wildlife habitat enhancement for the desired wildlife species. Implementation includes the exclusion of livestock to allow for adequate deferment for sufficient regrowth and development of the habitat.

Scenario Feature Measure: Acres Excluded

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: \$694.50

Scenario Cost/Unit: \$17.36

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	AUM	\$15.43	40	\$617.20
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	\$38.65	2	\$77.30

Practice: 645 - Upland Wildlife Habitat Management

Scenario: #7 - Deferred Acres

Scenario Description:

Setting is any land use with the potential to provide habitat for species of plants and animals identified as Rare and Declining and the habitat potential is not currently being captured. The identified habitat limiting factors can be restored, enhanced or created, with the application of this practice alone, or in combination with other supporting and facilitating practices. Monitoring will be used to determine if the conservation system meets or exceeds the minimum quality criteria for the targeted wildlife. Management will be implemented based on the findings of the habitat assessment and monitoring. Habitat management and monitoring needed to treat the resource concerns requires no training, no qualitative data assessment, no water quality monitoring and is low in complexity and intensity. Examples of prescribed monitoring include but are not limited to: photo points taken, use documentation by livestock, regeneration/breeding success, completing an annual management records log, documenting wildlife sightings, documenting location and species of invasive plants and condition of vegetative and structural treatments. The planner will specify locations and identify the methods to the customer who will implement the monitoring and management plan. Includes foregone income. Setting is cropland that will be managed to benefit rare and declining habitats through deferral or seeding to permanent vegetation.

Before Situation:

Existing degraded plant conditions and resulting inadequate habitat for fish and wildlife have resulted in low use of the area by target species. On dryland fields.

After Situation:

Based on the results of a State-approved upland wildlife habitat assessment process, the application of habitat management efforts and prescribed monitoring has been implemented. Crop production has been halted to allow for implementation, management, and monitoring of wildlife habitat, resulting in income foregone. With the application of this practice alone, or in combination with other supporting and facilitating practices, the inadequate habitat conditions have been addressed. Monitoring has maximized the benefits of the needed habitat treatment efforts.

Scenario Feature Measure: Acres Managed and Monitored

Scenario Unit: Acre

Scenario Typical Size: 5

Scenario Cost: \$2,247.78

Scenario Cost/Unit: \$449.56

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Foregone Income						
Fl, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	2.5	\$1,076.08
Fl, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	2.5	\$1,094.40
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	\$38.65	2	\$77.30

Practice: 646 - Shallow Water Development and Management

Scenario: #1 - Management, Low Level

Scenario Description:

This scenario addresses inadequate habitat for fish and wildlife on cropland. The resource concern is addressed by providing shallow water habitat for wildlife such as shorebirds, waterfowl, wading birds, mammals, fish, reptiles, amphibians, and other species that require shallow water for at least part of their life cycle. Sites are flooded up to a depth of 18" with an average depth of 9". Before flooding, fields are prepared by rolling residue if necessary. Water is provided by natural flooding and/or precipitation.

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.). Associated practices include Structure for Water Control (587) and Dike (356) if needed. Depending on local conditions, other Conservation Practices may also be required.

Scenario Feature Measure: Acre of shallow water

Scenario Unit: Acre

Scenario Typical Size: 2

Scenario Cost: \$148.23

Scenario Cost/Unit: \$74.12

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$44.18	1	\$44.18
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	\$20.81	5	\$104.05

Practice: 647 - Early Successional Habitat Development and Management

Scenario: #2 - Disking

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 exposing bare ground. The typical setting for this scenario is at the edge of crop fields, in pastures, and in odd areas such as pivot corners. This scenario is applicable nationwide. Where the management of woody plants is require to create or maintain early successional habitat conservation practice 314 brush management should be used. Where chemical control of weeds, including invasives, 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 327 Conservation Cover. Where the need is to create early successional habitat within or at the edge of woodland or forest use conservation practice 645 Upland Wildlife Habitat Management (edge feathering).

Before Situation:

The site is static or trending to higher successional plant species. The disturbance regeme 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 suchh as game bird chicks.

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.

Scenario Feature Measure: width and length of treated area

Scenario Unit: Acres

Scenario Typical Size: 2

Scenario Cost: \$188.12

Scenario Cost/Unit: \$94.06

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.27	2	\$20.54
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	\$167.58	1	\$167.58

Practice: 647 - Early Successional Habitat Development and Management

Scenario: #3 - Mowing and Disking

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 mowing dense vegetation and then a light disking to expose bare ground. All mowed areas are also disked. The typical setting for this scenario is at the edge of crop fields, in pastures, idle land and in odd areas such as pivot corners. Where the management of woody plants is require to create or maintain early successional habitat conservation practice 314 brush management should be used. Where chemical control of weeds, including invasives, 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 327 Conservation Cover. Where the need is to create early successional habitat within or at the edge of woodland or forest use conservation practice 645 Upland Wildlife Habitat Management (edge feathering).

Before Situation:

The site is static or trending to higher successional plant species. The disturbance regeme 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 suchh as game bird chicks.

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.

Scenario Feature Measure: Width and length of treated area

Scenario Unit: Acre

Scenario Typical Size: 2

Scenario Cost: \$408.17

Scenario Cost/Unit: \$204.09

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.27	2	\$20.54
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hour	\$49.49	3	\$148.47
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	3	\$71.58
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	\$167.58	1	\$167.58

Practice: 647 - Early Successional Habitat Development and Management

Scenario: #4 - Mowing and Heavy Disking

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 mowing dense vegetation and then a heavy disking (multiple passes) to expose bare ground. All mowed areas are also disked. The typical setting for this scenario is at the edge of crop fields, in pastures, idle land and in odd areas such as pivot corners. This scenario is applicable nationwide. Where the management of woody plants is require to create or maintain early successional habitat conservation practice 314 brush management should be used. Where chemical control of weeds, including invasives, 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 327 Conservation Cover. Where the need is to create early successional habitat within or at the edge of woodland or forest use conservation practice 645 Upland Wildlife Habitat Management (edge feathering).

Before Situation:

The site is static or trending to higher successional plant species. The disturbance regeme 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 suchh as game bird chicks.

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.

Scenario Feature Measure: Width and length of treated area

Scenario Unit: Acre

Scenario Typical Size: 2

Scenario Cost: \$428.71

Scenario Cost/Unit: \$214.36

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hour	\$49.49	3	\$148.47
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.27	4	\$41.08
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	3	\$71.58
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	\$167.58	1	\$167.58

Practice: 649 - Structures for Wildlife

Scenario: #7 - Brush Pile, Small

Scenario Description:

Small brush piles are created to provide shrubby/woody escape cover for wildlife. Pushing or cutting of select small trees and placement in selected locations to provide wildlife cover. Typical scenario of 10' x 20' area for structure covered by interlocking limbs of trees less than 12 inches in diameter.

Before Situation:

The existing habitat lacks escape, ground nesting and safe loafing cover.

After Situation:

Small brush piles provide needed escape, ground nesting and safe loafing cover for targeted wildlife species.

Scenario Feature Measure: brush piles

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$32.96

Scenario Cost/Unit: \$32.96

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$42.05	0.5	\$21.03
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	0.5	\$11.93

Practice: 649 - Structures for Wildlife

Scenario: #8 - Downed Tree Structure

Scenario Description:

Downed tree structures will be created to provide shrubby/woody escape cover for wildlife. Felling of select trees and placement in selected locations to provide wildlife cover. Minimum 30' x 50' area for structure covered by interlocking limbs of trees at least 12" in diameter. Payment includes tree felling and placement. Facilitating practices may include but not limited to: Upland Wildlife Habitat Management (645), Wetland Creation (658), Wetland Restoration (657), Wetland Enhancement (659), Early Successional Habitat Management/Development (647), Prescribed Burning (338), Restoration and Management of Rare and Declining Habitats (643), and Conservation Cover (327).

Before Situation:

A 40 acre operation managing for quail and other small game habitat. Shrubby/woody escape cover is often the missing habitat component for bobwhite quail and other small game in fields managed for upland wildlife wildlife.

After Situation:

The installation of a downed tree structure enhances the overall habitat needs of quail and other small game species. These structures/features enhance habitat and improve species survivability.

Scenario Feature Measure: area covered by structure

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$249.64

Scenario Cost/Unit: \$249.64

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$53.21	2	\$106.42
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.13	2	\$12.26
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	2	\$47.72
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	\$20.81	4	\$83.24

Practice: 649 - Structures for Wildlife

Scenario: #9 - Edgefeathering, light

Scenario Description:

Trees are cut and brush clipped in the border along a woodland edge using a chainsaw to create dense woody cover and a transitional area between a timbered edge and the adjacent land use such as cropland, pasture, or idle lands. The edge feathering will extend at least 30' wide, measured from the outside tree trunk, and at least 50' long -- resulting in a minimum area of 1500 square feet covered by interlocking woody branches. Cut stumps will be treated with brush herbicide. Some hand placement of the cut trees is necessary. Facilitating practices may include but not limited to: Upland Wildlife Habitat Management (645), Wetland Creation (658), Wetland Restoration (657), Wetland Enhancement (659), Early Successional Habitat Management/Development (647), Prescribed Burning (338), Restoration and Management of Rare and Declining Habitats (643), and Conservation Cover (327).

Before Situation:

Forested land with a hard edge of mature trees immedity adjacent to cropland or pasture. Woody cover is lacking for wildlife species such as rabbits, quail, songbirds and other wildlife species requiring dense woody cover near ground level. Average diameter of the main stand trees is 4 inches or less.

After Situation:

The cut trees serve as brush small piles, enhancing the overall habitat needs of wildlife species requiring dense woody cover and increase survival and the population of these species.

Scenario Feature Measure: area covered by edgefeathering

Scenario Unit: Linear Foot

Scenario Typical Size: 1,320

Scenario Cost: \$492.95

Scenario Cost/Unit: \$0.37

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.13	13.2	\$80.92
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	\$20.81	19.8	\$412.04

Practice: 649 - Structures for Wildlife

Scenario: #10 - Edgefeathering, heavy

Scenario Description:

Trees are cut and brush clipped in the border along a woodland edge using a tractor and chainsaw to create dense woody cover and a transitional area between a timbered edge and the adjacent land use such as cropland, pasture, or idle lands. The edge feathering will extend at least 30' wide, measured from the outside tree trunk, and at least 50' long -- resulting in a minimum area of 1500 square feet covered by interlocking woody branches. Cut stumps will be treated with brush herbicide. Some hand placement of the cut trees is necessary. Facilitating practices may include but not limited to: Upland Wildlife Habitat Management (645), Wetland Creation (658), Wetland Restoration (657), Wetland Enhancement (659), Early Successional Habitat Management/Development (647), Prescribed Burning (338), Restoration and Management of Rare and Declining Habitats (643), and Conservation Cover (327).

Before Situation:

Forested land with a hard edge of mature trees immediately adjacent to cropland or pasture. Woody cover close to the ground is lacking for wildlife species such as rabbits, quail, songbirds and other wildlife species requiring dense woody cover near ground level. Average diameter of the main stand trees is greater than 4 inches.

After Situation:

Creation of woody debris and small piles improves the overall habitat needs of wildlife species requiring dense woody cover and increase survival and the population of these species.

Scenario Feature Measure: area covered by edgefeathering

Scenario Unit: Linear Foot

Scenario Typical Size: 1,320

Scenario Cost: \$918.38

Scenario Cost/Unit: \$0.70

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$53.21	6.6	\$351.19
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.13	13.2	\$80.92
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	6.6	\$157.48
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	\$20.81	15.8	\$328.80

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #1 - Removal and/or Thinning with Chain Saw

Scenario Description:

Windbreak renovation requires the removal of degraded, overcrowded, or inappropriate trees or shrubs within a windbreak. This may include removal of entire rows, including stumps or roots, and/or selected trees/shrubs in order to prepare for the necessary planting of a replacement row or parts of the row within the windbreak, improve the health of the remaining rows, and/or allow for supplemental planting to expand the windbreak. Resource concerns: Degrade 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. 1,000 feet of windbreak/shelterbelt renovated.

Scenario Feature Measure: Length of Renovation

Scenario Unit: Linear Feet

Scenario Typical Size: 1,000

Scenario Cost: \$621.10

Scenario Cost/Unit: \$0.62

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.13	10	\$61.30
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	\$55.34	2	\$110.68
Pruning tools, hand tools	1318	Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included.	Hour	\$4.77	2	\$9.54
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	\$94.59	2	\$189.18
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	\$20.81	10	\$208.10
Materials						
Herbicide, Triclopyr	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acre	\$42.30	1	\$42.30

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #2 - Within Row Replacement, Containerized Planting Stock

Scenario Description:

Parts of the windbreak being renovated have died. Supplemental plantings of containerized trees/shrubs within existing rows or establishment of an additional row will improve the effectiveness and longevity of the windbreak. Payment includes materials, labor and equipment needed to hand plant the stock. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition -Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter.

Before Situation:

Sections of the windbreak had dead trees/shrubs that were inhibiting windbreak effectiveness. The dead plants have been removed and the site has been prepared for planting.

After Situation:

The integrity and function of the windbreak is restored by hand planting containerized trees/shrubs in gaps created through previous plant mortality.

Scenario Feature Measure: Length of Renovation

Scenario Unit: Linear Foot

Scenario Typical Size: 500

Scenario Cost: \$784.06

Scenario Cost/Unit: \$1.57

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$11.62	3	\$34.86
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	3	\$62.43
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	\$94.59	3	\$283.77
Materials						
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	\$0.09	50	\$4.50
Fertilizer, tree, slow release, premix packet or spike	1594	Slow release fertilizer to gradually apply nutrients over time for tree establishment. 2.0 Oz Packet (Premixed: 16-16-16 or 16-8-8) or Fertilizer Spike	Each	\$0.70	50	\$35.00
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	\$7.41	25	\$185.25
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	\$7.13	25	\$178.25

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #4 - Within Row Replacement, Bare-root Planting Stock

Scenario Description:

Parts of the windbreak being renovated have died. Supplemental plantings of bare-root trees/shrubs within existing rows or establishment of an additional row will improve the effectiveness and longevity of the windbreak. Payment includes materials, labor and equipment needed to hand plant the stock. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition -Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter.

Before Situation:

Sections of the windbreak had dead trees/shrubs that were inhibiting windbreak effectiveness. The dead plants have been removed and the site has been prepared for planting.

After Situation:

The integrity and function of the windbreak is restored by hand planting bare-root trees/shrubs in gaps created through previous plant mortality.

Scenario Feature Measure: Length of Renovation

Scenario Unit: Linear Foot

Scenario Typical Size: 500

Scenario Cost: \$195.77

Scenario Cost/Unit: \$0.39

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$11.62	1	\$11.62
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	1	\$20.81
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	\$94.59	1	\$94.59
Materials						
Tree, conifer, seedling, bare root, 2-1	1514	Bare root conifer trees, 2-1 (3 years old). Includes materials and shipping only.	Each	\$0.57	25	\$14.25
Tree, hardwood, seedling or transplant, bare root, 16-36"	1510	Bare root hardwood trees 18-36" tall. Includes materials and shipping only.	Each	\$0.60	25	\$15.00
Fertilizer, tree, slow release, premix packet or spike	1594	Slow release fertilizer to gradually apply nutrients over time for tree establishment. 2.0 Oz Packet (Premixed: 16-16-16 or 16-8-8) or Fertilizer Spike	Each	\$0.70	50	\$35.00
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	\$0.09	50	\$4.50

Practice: 656 - Constructed Wetland

Scenario: #1 - Constructed Wetland, Dense Planting

Scenario Description:

This practice scenario includes the basic earthwork and native and/or organic wetland vegetation needed to create a constructed wetland to treat contaminated agricultural runoff or effluent from a drainage system high in nutrients. All other components, such as water control structures, dikes or upstream sediment basins, must be paid for under facilitating practices. Soil, water and tissue sampling are required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrients and pathogens. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634); Critical Area Planting (342); Filter Strip (393).

Before Situation:

Degraded water quality and/or ponding due to the nutrient content and/or sediment of agricultural runoff.

After Situation:

A 1 acre constructed wetland (measured by the size of the treatment pool suitable for wetland vegetation) will be constructed with an average 18" depth. Only the earthwork and wetland vegetation are considered in this scenario. Vegetation is planted at a spacing of 3 by 3 feet. Any structures or sediment basins will be designed under a separate practice. The constructed wetland is sited near the property boundary, but still takes cropland out of production (1/2 wetland acreage). The constructed wetland treats the effluent by creating conditions at the plant/soil/water interface for biochemical nutrient removal before the effluent is transported to a waste storage facility or discharged off site if permitted by regulation.

Scenario Feature Measure: Area of Constructed Wetland

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$13,161.61

Scenario Cost/Unit: \$13,161.61

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.38	1613	\$3,838.94
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$0.83	807	\$669.81
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$299.51	1	\$299.51
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	0.25	\$109.44
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	0.25	\$107.61
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	\$20.81	48.4	\$1,007.20
Materials						
Native Aquatic Plants, Emergent or Submerged	2336	Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping.	Each	\$1.37	4840	\$6,630.80
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	2	\$498.30

Practice: 657 - Wetland Restoration

Scenario: #1 - Mineral Flat, Tile Removal

Scenario Description:

A Mineral Flat wetland is to be restored. The wetland size is 40 Acres consists of surface saturated soils interspersed with shallow depressions that are not depressional class HGM wetlands. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The site has been drained with a tile drain system. A suitable seed bank exists for natural regeneration to re-establish hydrophytic vegetation. The site is in agricultural production.

After Situation:

The drain tiles have been rendered non-functional by excavating 50 foot lengths of tile mains and laterals in 6 separate locations, and backfilling with excavated earth, which is compacted with the excavator bucket. There are no facilitating practices. 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.

Scenario Feature Measure: Acres of wetland

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: \$18,158.82

Scenario Cost/Unit: \$453.97

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$54.57	8	\$436.56
Foregone Income						
Fl, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	20	\$8,608.60
Fl, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	20	\$8,755.20
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	8	\$190.88
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	\$167.58	1	\$167.58

Practice: 657 - Wetland Restoration

Scenario: #3 - Depression Sediment Removal and Ditch Plug

Scenario Description:

A Depressional HGM class wetland is to be restored. The wetland size is 10 acres. The site is a recharge depression, fed only from surface runoff. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- 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. The wetland receives surface runoff from an adjacent upland watershed, and ponds water on a shallow perched layer. The watershed has been converted from native to agricultural landuse, and the resultant soil erosion has deposited 6" of sediment in the bottom of the depression.

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.

Scenario Feature Measure: Acres of Wetland

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: \$29,992.02

Scenario Cost/Unit: \$2,999.20

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$181.67	2	\$363.34
Scraper, self propelled, 21 CY	1208	Self propelled earthmoving scraper with 21 CY capacity. Does not include labor.	Hour	\$355.71	63	\$22,409.73
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	5	\$2,188.80
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	5	\$2,152.15
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	\$29.64	65	\$1,926.60
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	\$475.70	2	\$951.40

Practice: 657 - Wetland Restoration

Scenario: #4 - Riverine Channel and Floodplain Restoration

Scenario Description:

A Riverine HGM landscape on a small stream on a low stream order riparian landscape has been partially converted to agricultural production on 10 acres of the 15 acre wetland tract. The stream channel has degraded. The reach is 1500 feet in length. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

Channel incision has broken the lateral connectivity between the stream and floodplain. The conversion to cropland was accompanied by filling and leveling of backswamp, side channel, and oxbow features which formerly ponded water or exposed the floodplain groundwater table. The site no longer has access to floodwater or water surface profile supported groundwater. No suitable seed bank exists for natural regeneration of the original hydrophytic plant community, either in the channel, or on the floodplain.

After Situation:

The hydrology of the site is restored by the installation of a series of rock check structures to raise the stream water surface profile. Floodplain macrotopographic features replicating the original side channels, oxbows, and backswamps are constructed by excavation. Spoil is placed adjacent to the excavations to replicate natural depositional features. The average depth of the excavated features is 0.5 feet, and the surface area of the excavations is 25% of the tract size. The eroding stream bank is stabilized with soil bio-engineering features, and fish habitat improvement measures are installed in the channel. The tract is seeded to appropriate hydrophytic and upland vegetation, both woody and herbaceous. Facilitating practices are Streambank and Shoreline protection, Structure for Water Control, Conservation Cover, Tree/Shrub Establishment, and Stream Habitat Improvement and Management. 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.

Scenario Feature Measure: Acres of wetland

Scenario Unit: Acre

Scenario Typical Size: 15

Scenario Cost: \$21,725.29

Scenario Cost/Unit: \$1,448.35

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Scraper, self propelled, 21 CY	1208	Self propelled earthmoving scraper with 21 CY capacity. Does not include labor.	Hour	\$355.71	24	\$8,537.04
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	\$181.67	34	\$6,176.78
Foregone Income						
Fl, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	5	\$2,188.80
Fl, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	5	\$2,152.15
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	\$29.64	58	\$1,719.12
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	\$475.70	2	\$951.40

Practice: 657 - Wetland Restoration

Scenario: #5 - Vernal Pool

Scenario Description:

Restoration of vernal pools on suitable sites within areas of hardwood forest. This involves restoration of hydrology to a vernal pool site that provides season shallow surface water. Resource concerns include INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The site has mature trees and vegetation typical to vernal pools but the hydrology of the site has been altered such that the site no longer is inundated seasonally which is required for wildlife that are dependent on vernal pools for part of their life cycle. The existing native vegetation precludes the use of standard wetland restoration construction methods.

After Situation:

Seasonal inundation of the site has been restored to the site without significant disturbance to the native vegetation. Wildlife habitat for species that utilize vernal pools has been restored to the site.

Scenario Feature Measure: Area of pool

Scenario Unit: Acre

Scenario Typical Size: 0

Scenario Cost: \$2,613.42

Scenario Cost/Unit: #Div/0!

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$42.05	8	\$336.40
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$54.57	16	\$873.12
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	\$20.81	16	\$332.96
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	24	\$572.64
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	2	\$498.30

Practice: 657 - Wetland Restoration

Scenario: #6 - Riverine, oxbow wetland

Scenario Description:

Restoration of an 0.40 acre oxbow wetland to create off-channel habitat for species such as Topeka Shiner. Includes removal of post settlement alluvium down to the original soil surface, slope, and contour. Reconnection of the oxbow to the stream channel using original, natural inflow and outflow channels will include excavation of post settlement alluvium to the original soil surface, slope, and contour. Resource concerns include habitat degradation and excessive sedimentation.

Before Situation:

Backwater lakes and oxbows have become filled with sediment eliminating or degrading habitat for fish and other aquatic organisms. Substrates are not compact enough to support emergent vegetation. The stream is no longer connected to this off-channel habitat necessary for parts of the life cycle of fish and aquatic organisms that live in the main channel.

After Situation:

A 0.4 acre off-channel oxbow (35' bottom width, 56' topwidth, 3.5' depth, 310 feet long) is excavated to remove the post settlement alluvium down to original soil surface, slope and contour. Oxbow is reconnected to the stream channel by excavating the original inflow and outflow channels to post settlement grade, slope and contour.

Scenario Feature Measure: area of excavation

Scenario Unit: Acre

Scenario Typical Size: 0

Scenario Cost: \$11,420.92

Scenario Cost/Unit: #Div/0!

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$121.14	18	\$2,180.52
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	\$185.79	36	\$6,688.44
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	\$29.64	54	\$1,600.56
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	\$475.70	2	\$951.40

Practice: 658 - Wetland Creation

Scenario: #1 - Excavated

Scenario Description:

A wetland is created on a flat mineral upland at a location where surface runoff may be intercepted and ponded by excavation. Resource concerns are 22 - INDEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The site is in cropland on an upland, non floodplain site (interfluve).

After Situation:

An excavation with an average depth of 12" has created a shallow depression in a broad swale which intercepts surface runoff. The excavated material has been spread on adjacent areas. The INADEQUATE HABITAT FOR FISH AND WILDLIFE resource concern has been addressed with the provision of seasonal open water for terrestrial, aquatic, and waterfowl species.

Scenario Feature Measure: Acres of Wetland

Scenario Unit: Acre

Scenario Typical Size: 5

Scenario Cost: \$20,796.93

Scenario Cost/Unit: \$4,159.39

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.25	8067	\$18,150.75
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	2.5	\$1,076.08
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	2.5	\$1,094.40
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	\$475.70	1	\$475.70

Practice: 658 - Wetland Creation

Scenario: #2 - Embankment

Scenario Description:

A wetland is created on a flat mineral upland at a location where surface runoff may be intercepted and ponded by excavation and with an embankment. Facilitating practices may include Structure for Water Control (587). Resource concerns are 22 - INDEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The site is in cropland on an upland, non floodplain site (interfluve).

After Situation:

An excavation/embankment with an average depth of 12" has created a shallow depression in a broad swale which intercepts surface runoff. The excavated material has been spread on adjacent areas and used to compact the embankment. The INADEQUATE HABITAT FOR FISH AND WILDLIFE resource concern has been addressed with the provision of seasonal open water for terrestrial, aquatic, and waterfowl species.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 5

Scenario Cost: \$21,493.68

Scenario Cost/Unit: \$4,298.74

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$121.14	125	\$15,142.50
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	2.5	\$1,076.08
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	2.5	\$1,094.40
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	\$29.64	125	\$3,705.00
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	\$475.70	1	\$475.70

Practice: 659 - Wetland Enhancement

Scenario: #1 - Mineral Flat, Tile Removal

Scenario Description:

A Mineral Flat wetland is to be enhanced. The tract size is 40 Acres consists of surface saturated soils interspersed with shallow depressions that are not depressional class HGM wetlands. The wetland size is also 40 acres. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The site has been drained with a tile drain system. A suitable seed bank exists for natural regeneration to re-establish hydrophytic vegetation. The site is in agricultural production.

After Situation:

The drain tiles have been rendered non-functional by excavating 50 foot lengths of tile mains and laterals in 6 separate locations, and backfilling with excavated earth, which is compacted with the excavator bucket. There are no facilitating practices. Enhancement 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.

Scenario Feature Measure: Acres of Wetland

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: \$18,158.82

Scenario Cost/Unit: \$453.97

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$54.57	8	\$436.56
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	20	\$8,608.60
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	20	\$8,755.20
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	8	\$190.88
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	\$167.58	1	\$167.58

Practice: 659 - Wetland Enhancement

Scenario: #3 - Depression, Sediment Removal and Ditch Plug

Scenario Description:

A Depressional HGM class wetland is to be enhanced. The wetland size is 10 acres. The site is a recharge depression, fed only from surface runoff. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- 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. The wetland receives surface runoff from an adjacent upland watershed, and ponds water on a shallow perched layer. The watershed has been converted from native to agricultural landuse, and the resultant soil erosion has deposited 6" of sediment in the bottom of the depression.

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.

Scenario Feature Measure: Acres of Wetland

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: \$29,992.02

Scenario Cost/Unit: \$2,999.20

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Scraper, self propelled, 21 CY	1208	Self propelled earthmoving scraper with 21 CY capacity. Does not include labor.	Hour	\$355.71	63	\$22,409.73
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	\$181.67	2	\$363.34
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	5	\$2,152.15
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	5	\$2,188.80
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	\$29.64	65	\$1,926.60
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	\$475.70	2	\$951.40

Practice: 659 - Wetland Enhancement

Scenario: #4 - Riverine, Channel and Floodplain Restoration

Scenario Description:

A Riverine HGM landscape on a small stream on a low stream order riparian landscape has been converted to agricultural production. The stream channel has degraded. The reach is 1500 feet in length, and the wetland area is 10 acres. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

Channel incision has broken the lateral connectivity between the stream and floodplain. The conversion to cropland was accompanied by filling and leveling of backswamp, side channel, and oxbow features which formerly ponded water or exposed the floodplain groundwater table. The site no longer has access to floodwater or water surface profile supported groundwater. No suitable seed bank exists for natural regeneration of the original hydrophytic plant community, either in the channel, or on the floodplain.

After Situation:

The hydrology of the site is restored by the installation of a series of rock check structures to raise the stream water surface profile. Floodplain macrotopographic features replicating the original side channels, oxbows, and backswamps are constructed by excavation. Spoil is placed adjacent to the excavations to replicate natural depositional features. The average depth of the excavated features is 2 feet, and the surface area of the excavations is 25% of the tract size. The eroding stream bank is stabilized with soil bio-engineering features, and fish habitat improvement measures are installed in the channel. The tract is seeded to appropriate hydrophytic and upland vegetation, both woody and herbaceous. Facilitating practices are Streambank and Shoreline protection, Structure for Water Control, Conservation Cover, Tree/Shrub Establishment, and Stream Habitat Improvement and Management. 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.

Scenario Feature Measure: Acres of Wetland

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: \$21,725.29

Scenario Cost/Unit: \$2,172.53

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Scraper, self propelled, 21 CY	1208	Self propelled earthmoving scraper with 21 CY capacity. Does not include labor.	Hour	\$355.71	24	\$8,537.04
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	\$181.67	34	\$6,176.78
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	5	\$2,152.15
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	5	\$2,188.80
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	\$29.64	58	\$1,719.12
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	\$475.70	2	\$951.40

Practice: 659 - Wetland Enhancement

Scenario: #5 - Vernal Pool

Scenario Description:

Wetland hardwood forest with sites that have potential to be enhanced with vernal pools. This involves enhancement of hydrology of a vernal pool site that provides season shallow surface water . Resource concerns include INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The site has mature trees and vegetation typical to vernal pools but the site does not pond water seasonally which is required for wildlife that are dependent on vernal pools for part of their life cycle. The existing native vegetation precludes the use of standard wetland enhancement construction methods.

After Situation:

Seasonal inundation of the site has been enhanced on the site without significant disturbance to the native vegetation. Wildlife habitat for species that utilize vernal pools has been developed on the site.

Scenario Feature Measure: Area of pool

Scenario Unit: Acre

Scenario Typical Size: 0

Scenario Cost: \$2,613.42

Scenario Cost/Unit: #Div/0!

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$42.05	8	\$336.40
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$54.57	16	\$873.12
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.86	24	\$572.64
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	16	\$332.96
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	2	\$498.30

Practice: 666 - Forest Stand Improvement

Scenario: #1 - Forest Stand Improvement, Light

Scenario Description:

All materials and labor required to manipulate species composition, stand structure and stocking on forestland. Light forest stand improvement will: Reduce basal area by 20 - 29 square feet per acre (or) Cut and/or kill 100 - 199 trees per acre (or) Release 10 - 20 crop trees per acre and/or kill any vines growing on crop trees by an approved method such as "cut stump" with herbicide to prevent resprouting. Use a current and approved Forest Management Plan for estimated basal area to be removed, number of trees needing to be cut and/or killed, crop trees needing to be released, and/or vines needing killed.

Before Situation:

Forest stand is slightly overstocked and/or composed of some undesirable species due to lack of forest management. This has negatively impacted forest health, productivity, and/or sustainability. Wildlife habitat, such as hard and soft mast production, browse, nesting cover, bedding areas, etc. is lacking.

After Situation:

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.

Scenario Feature Measure: Area Treated

Scenario Unit: Acre

Scenario Typical Size: 55

Scenario Cost: \$6,141.00

Scenario Cost/Unit: \$111.65

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.13	90	\$551.70
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	\$55.34	20	\$1,106.80
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	\$31.19	110	\$3,430.90
Materials						
Herbicide, Picloram	337	Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$19.12	55	\$1,051.60

Practice: 666 - Forest Stand Improvement

Scenario: #2 - Forest Stand Improvement, Medium

Scenario Description:

All materials and labor required to manipulate species composition, stand structure and stocking on forestland. Medium forest stand improvement will: Reduce basal area by 30-40 square feet per acre (or) Cut and/or kill 200 - 400 trees per acre (or) Release 21 - 40 crop trees per acre and kill any vines growing on crop trees by an approved method such as "cut stump" with herbicide to prevent resprouting. Use a current and approved Forest Management Plan for estimated basal area to be removed, number of trees needing to be cut and/or killed, crop trees needing to be released, and/or vines needing killed.

Before Situation:

Forest stand is moderately overstocked and/or composed of an unacceptable level of undesirable species due to lack of forest management. This has negatively impacted forest health, productivity, and/or sustainability. Wildlife habitat, such as hard and soft mast production, browse, nesting cover, bedding areas, etc. is lacking.

After Situation:

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.

Scenario Feature Measure: Area Treated

Scenario Unit: Acre

Scenario Typical Size: 55

Scenario Cost: \$7,481.22

Scenario Cost/Unit: \$136.02

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.13	112	\$686.56
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	\$55.34	26	\$1,438.84
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	\$31.19	138	\$4,304.22
Materials						
Herbicide, Picloram	337	Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$19.12	55	\$1,051.60

Practice: 666 - Forest Stand Improvement

Scenario: #3 - Forest Stand Improvement, Heavy

Scenario Description:

All materials and labor required to manipulate species composition, stand structure and stocking on forestland. Heavy forest stand improvement will: Reduce basal area by 41 or more square feet per acre (or) Cut and/or kill over 400 trees per acre (or) Release 41 or more crop trees per acre and kill any vines growing on crop trees by an approved method such as "cut stump" with herbicide to prevent resprouting. Use a current and approved Forest Management Plan for estimated basal area to be removed, number of trees needing to be cut and/or killed, crop trees needing to be released, and/or vines needing killed.

Before Situation:

Forest stand is heavily overstocked and/or composed of an unacceptable level of undesirable species due to lack of forest management. This has negatively impacted forest health, productivity, and/or sustainability. Wildlife habitat, such as hard and soft mast production, browse, nesting cover, bedding areas, etc. is lacking. Understory vegetation consists of mostly shade-tolerant species with little to no desirable regeneration present.

After Situation:

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.

Scenario Feature Measure: Area Treated

Scenario Unit: Acre

Scenario Typical Size: 55

Scenario Cost: \$9,405.02

Scenario Cost/Unit: \$171.00

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.13	145	\$888.85
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	\$55.34	34	\$1,881.56
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	\$31.19	179	\$5,583.01
Materials						
Herbicide, Picloram	337	Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$19.12	55	\$1,051.60

Practice: 666 - Forest Stand Improvement

Scenario: #4 - Temporary Forest Openings, patch clearcuts

Scenario Description:

Creating 2 one acre patches in over-mature and/or degraded stands using hand tools such as chainsaws. Resource concerns include: Undesirable plant productivity and health, Inadequate structure and composition, and habitat degradation.

Before Situation:

The existing stand is overly mature and/or has been degraded in value by past harvesting practices. The level of acceptable growing stock is too low to justify managing this stand in its present condition. The present form, species composition and structure cannot meet the resource concerns and landowner objectives. Creating small openings by cutting all trees greater than 2" in diameter will foster the regeneration of high-value shade intolerant species. The work will be done with chainsaws.

After Situation:

A new, young stand of desirable species is established. In addition, early successional wildlife habitat as well as forest type diversity are created.

Scenario Feature Measure: Area treated

Scenario Unit: Acre

Scenario Typical Size: 2

Scenario Cost: \$431.04

Scenario Cost/Unit: \$215.52

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.13	16	\$98.08
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	\$20.81	16	\$332.96

Practice: 666 - Forest Stand Improvement

Scenario: #5 - Open Woodland Restoration

Scenario Description:

Removing or reducing tree canopy and utilizing chemical treatment (except for non-sprouting woody species) to promote herbaceous growth or early woody succession to benefit wildlife habitat. Designed for open woodland restoration where Basal Area removal is >40 square feet per acre, or >400 stems per acre. This practice is intended to restore and manage the ecological site for associated wildlife species that benefit from habitats such as open woodlands by felling the majority of the undesirable trees to allow installation of facilitating practices. Facilitating practices may include but not limited to: Early Successional Habitat Management/Development (647), Prescribed Burning (338), Restoration and Management of Rare and Declining Habitats (643), and Conservation Cover (327).

Before Situation:

A stand of trees that is even aged and lacks structural diversity. The understory has a minimal amount of herbaceous and early woody successional vegetation. Wildlife food, cover, and shelter are lacking, and woody cover control is needed to manage for associated wildlife species that benefit from habitats such as savannas and open woodlands.

After Situation:

The ecological site is restored and flora and fauna that depend on open woodland habitat flourish.

Scenario Feature Measure: area of opening

Scenario Unit: Acres

Scenario Typical Size: 10

Scenario Cost: \$2,735.90

Scenario Cost/Unit: \$273.59

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.13	45	\$275.85
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	\$55.34	10	\$553.40
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	\$31.19	55	\$1,715.45
Materials						
Herbicide, Picloram	337	Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$19.12	10	\$191.20

Practice: 670 - Lighting System Improvement

Scenario: #1 - Lighting - CFL

Scenario Description:

Installation of dimmable CFLs to replace incandescent lamps on a one-for-one basis. Light fixtures do not have to be replaced. 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. Payment includes lightbulbs and labor to install.

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. 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.

Associated practices/activities: 122-AgEMP - HQ, 672 Building Envelope Improvement, and 374-Farmstead Energy Improvement.

Scenario Feature Measure: Each lamp replaced

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$17.69

Scenario Cost/Unit: \$17.69

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	0.167	\$3.48
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	\$14.21	1	\$14.21

Practice: 670 - Lighting System Improvement

Scenario: #2 - Lighting - LED

Scenario Description:

Installation of dimmable LEDs to replace incandescent lamps on a one-for-one basis. Light fixtures do not have to be replaced. 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. Payment includes lightbulb and labor to install.

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. 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.

Associated practices/activities: 122-AgEMP - HQ, 672 Building Envelope Improvement, and 374-Farmstead Energy Improvement.

Scenario Feature Measure: Each lamp replaced

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$22.60

Scenario Cost/Unit: \$22.60

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	0.167	\$3.48
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	\$19.12	1	\$19.12

Practice: 670 - Lighting System Improvement

Scenario: #3 - Lighting - Linear Fluorescent

Scenario Description:

Installation of a lighting system consisting 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. Payment includes lamps, ballast, fixtures and labor to install.

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. 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.

Associated practices/activities: may include 122-AgEMP - HQ, 672 Building Envelope Improvement, and 374-Farmstead Energy Improvement.

Scenario Feature Measure: Each fixture replaced

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$332.82

Scenario Cost/Unit: \$332.82

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$31.19	1	\$31.19
Materials						
Lighting, fixture, Fluorescent, 75 watt	1168	75 watt fluorescent lamp fixture with T5 or T8 lamps and ballast. Materials only.	Each	\$301.63	1	\$301.63

Practice: 670 - Lighting System Improvement

Scenario: #4 - Lighting - Outdoor/High Bay

Scenario Description:

Installation of a lighting system consisting of an outdoor/high bay light such as, but not limited to, pulse-start metal halide (PSMH) lamp with a matched ballast. Associated materials for installation of replacement fixtures are included. Appropriate disposal of existing lamps, ballasts and other materials is required. Payment includes lamp and labor to install.

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. 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.

Associated practices/activities: may include 122-AgEMP - HQ, 672 Building Envelope Improvement, and 374-Farmstead Energy Improvement.

Scenario Feature Measure: Each fixture replaced

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$254.57

Scenario Cost/Unit: \$254.57

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$31.19	3	\$93.57
Materials						
Lighting, Pulse Start Metal Halide	2425	Replacement of lighting with PSMH Light.	Watt	\$0.92	175	\$161.00

Practice: 670 - Lighting System Improvement

Scenario: #5 - Controller - Single Function Automatic Controller System

Scenario Description:

The typical scenario consists of a single function automatic control system for lighting installed on an existing manually controlled lighting system. Typical components may include any of the following: wiring, sensors, data logger, logic controller, communication link, software, switches, and relay. Payment includes materials and appurtanences and labor to install.

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. 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.

Associated practices/activities may include: 122-AgEMP - HQ, 670- Lighting System Improvement, 672- Building Envelope Improvement, and other activities within 374-Farmstead Energy Improvement.

Scenario Feature Measure: Each system

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$1,423.70

Scenario Cost/Unit: \$1,423.70

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$31.19	8	\$249.52
Materials						
Switches and Controls, programmable controller	1193	Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	\$153.22	1	\$153.22
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	\$605.73	1	\$605.73
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	\$415.23	1	\$415.23

Practice: 670 - Lighting System Improvement

Scenario: #6 - Controller - Multiple Function Automatic Controller System

Scenario Description:

The typical scenario consists of a multiple function automatic control system for lighting installed on an existing manually controlled lighting system. Typical components may include any of the following: wiring, sensors, data logger, logic controller, communication link, software, switches, and relay. Payment includes materials and appurtanences and labor to install.

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. 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.

Associated practices/activities may include: 122-AgEMP - HQ, 670- Lighting System Improvement, 672- Building Envelope Improvement, and other activities within 374-Farmstead Energy Improvement.

Scenario Feature Measure: Each system

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$4,374.24

Scenario Cost/Unit: \$4,374.24

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$31.19	38	\$1,185.22
Materials						
Switches and Controls, programmable controller	1193	Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	\$153.22	5	\$766.10
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	\$605.73	4	\$2,422.92

Practice: 672 - Building Envelope Improvement

Scenario: #1 - Building Envelope - Attic Insulation

Scenario Description:

Install a minimum R-7 insulation in an 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. Payment includes materials, equipment and labor to install.

Before Situation:

An agriculture 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. 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.

Associated practices/activities: 122-AgEMP - HQ, 670- Lighting System Improvement, and 374-Farmstead Energy Improvement.

Scenario Feature Measure: Area of Attic Insulated

Scenario Unit: Square Foot

Scenario Typical Size: 20,000

Scenario Cost: \$15,800.00

Scenario Cost/Unit: \$0.79

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<i>Materials</i>						
Insulation, Fiberglass or cellulose, R-15	1196	Fiberglass or cellulose insulation R-15, includes materials, equipment and labor to install.	Square Foot	\$0.79	20000	\$15,800.00

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/cu.ft. or higher density, (3.0 or higher density preferred) with a form of physical protective barrier on lower 2' (may be 6 lbs/cu.ft. or higher density 1/8" thick foam, or treated lumber). Payment includes materials, equipment and labor to install.

Before Situation:

An agriculture 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 in a 40' x 400' poultry house. 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.

Associated practices/activities: may include 122-AgEMP - HQ, 670- Lighting System Improvement, and 374-Farmstead Energy Improvement.

Scenario Feature Measure: Area of Wall Insulated

Scenario Unit: Square Foot

Scenario Typical Size: 4,500

Scenario Cost: \$8,730.00

Scenario Cost/Unit: \$1.94

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<i>Materials</i>						
Insulation, polyurethane, R-7, with sheathing skirt	1198	Closed-cell polyurethane foam insulation (minimum 1" thickness (R-7) with a protective sheeting barrier on lower 2 feet of wall height. Includes materials, equipment and labor to install.	Square Foot	\$1.94	4500	\$8,730.00

Practice: 672 - Building Envelope Improvement

Scenario: #3 - Building Envelope - Sealant

Scenario Description:

Seal the gaps between walls, gables, ceiling, etc. in a poultry house or greenhouse. Payment includes materials, equipment and labor performed by a professional contractor.

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. 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. 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.

Associated practices/activities: may include 122-AgEMP - HQ, 670- Lighting System Improvement, and 374-Farmstead Energy Improvement.

Scenario Feature Measure: Perimeter of heated structure

Scenario Unit: Foot

Scenario Typical Size: 2,400

Scenario Cost: \$4,032.00

Scenario Cost/Unit: \$1.68

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<i>Materials</i>						
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	\$1.68	2400	\$4,032.00

Practice: 672 - Building Envelope Improvement

Scenario: #4 - Building Envelope - Greenhouse Screens

Scenario Description:

Installation of a mechanical energy screen system associated with a greenhouse consisting 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. Payment includes materials and labor to install.

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. 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.

Associated practices/activities: may include 122-AgEMP - HQ, 670- Lighting System Improvement, and 374-Farmstead Energy Improvement.

Scenario Feature Measure: Area of Screen

Scenario Unit: Square Foot

Scenario Typical Size: 25,000

Scenario Cost: \$47,499.04

Scenario Cost/Unit: \$1.90

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$31.19	16	\$499.04
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	\$1.88	25000	\$47,000.00

Practice: 672 - Building Envelope Improvement

Scenario: #5 - Building Envelope - Greenhouse Unglazed Wall Insulation

Scenario Description:

Installation of insulation in greenhouse 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. Payment includes materials and labor to install.

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. 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.

Associated practices/activities: may include 122-AgEMP - HQ, 670- Lighting System Improvement, and 374-Farmstead Energy Improvement.

Scenario Feature Measure: Square Feet of insulation

Scenario Unit: Square Foot

Scenario Typical Size: 25,000

Scenario Cost: \$7,249.04

Scenario Cost/Unit: \$0.29

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$31.19	16	\$499.04
Materials						
Insulation, Greenhouse, Reflective Bubble	2410	Double bubble reflective insulation with aluminum foil on both sides. Includes materials and shipping only.	Square Foot	\$0.27	25000	\$6,750.00

Practice: 672 - Building Envelope Improvement

Scenario: #6 - Building Envelope - Insulated Door Upgrade

Scenario Description:

Replace an existing door with an insulated door, such as but not limited to a steel roll up door in a poultry building. Increased insulation reduces seasonal heat loss and heat gain which reduces the respective need for heating and cooling equipment to operate. Payment includes materials and labor to install.

Before Situation:

Agriculture building's existing door is inefficient

After Situation:

A 20 gauge 12' x 12' rolling service insulated steel door is installed as a replacement for an existing less efficient door on a poultry building. 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.

Associated practices/activities may include: 122-AgEMP - HQ, 670- Lighting System Improvement, and 374-Farmstead Energy Improvement.

Scenario Feature Measure: Square foot

Scenario Unit: Square Foot

Scenario Typical Size: 144

Scenario Cost: \$1,503.76

Scenario Cost/Unit: \$10.44

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$31.19	8	\$249.52
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	\$8.71	144	\$1,254.24

Practice: 672 - Building Envelope Improvement

Scenario: #7 - Building Envelope - Insulated Curtain Upgrade

Scenario Description:

Replacement of an existing non-insulated curtain with a seven layer insulated curtain with an R- value of 3 for a livestock building. The curtain's two outer layers are vinyl and polyethylene and the five inner layers are composed of insulating materials with air trapping fibers and a vapor barrier. Payment includes curtain and labor to install. Payment does not includes mounting accessories because the scenario assumes the curtain is replacing a non-insulated curtain.

Before Situation:

Existing livestock curtain is inefficient.

After Situation:

A 7 layer insulated curtain is installed as a replacement for an existing less efficient curtain on a livestock building. 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.

Associated practices/activities may include: 122-AgEMP - HQ, 670- Lighting System Improvement, and 374-Farmstead Energy Improvement.

Scenario Feature Measure: Square Foot

Scenario Unit: Square Foot

Scenario Typical Size: 1,080

Scenario Cost: \$2,637.44

Scenario Cost/Unit: \$2.44

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$31.19	16	\$499.04
Materials						
Curtain , 7-Layer, R3 Insulated	2427	Seven layer insulated curtain with an R-value of 3 for a livestock building. Typical curtain size is 4' x 270'. The curtain's two outer layers are vinyl and polyethylene and the five inner layers are composed of insulating materials with air trapping fi	Square Foot	\$1.98	1080	\$2,138.40

Practice: 672 - Building Envelope Improvement

Scenario: #8 - Building Envelope - Curtain Wall Conversion

Scenario Description:

Converting part or all of a curtain wall to solid insulated wall by installation of an insulated metal cover in a livestock building. Payment includes materials and labor for the installation of a weather proof exterior such as, but not limited to, corrugated steel, and insulation such as, but not limited to polyurethane R-7. Payment does not include upgrade to ventilation.

Before Situation:

Existing livestock curtain is inefficient.

After Situation:

An insulated metal wall is installed as a replacement for an existing less efficient curtain on a livestock building. Conversion is for an building that requires 3040 sq ft of wall to replace the curtains. 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.

Associated practices/activities may include: 122-AgEMP - HQ, 670- Lighting System Improvement, and 374-Farmstead Energy Improvement.

Scenario Feature Measure: Square Foot

Scenario Unit: Square Foot

Scenario Typical Size: 3,040

Scenario Cost: \$11,325.10

Scenario Cost/Unit: \$3.73

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	30	\$624.30
Materials						
Insulation, polyurethane, R-7, with sheathing skirt	1198	Closed-cell polyurethane foam insulation (minimum 1" thickness (R-7) with a protective sheathing barrier on lower 2 feet of wall height. Includes materials, equipment and labor to install.	Square Foot	\$1.94	3040	\$5,897.60
Corrugated Steel, 28 gage	223	Corrugated or ribbed, galvanized, 28 gauge, includes fasteners, materials only.	sq ft	\$1.58	3040	\$4,803.20

Practice: 720 - Controlled Traffic Farming

Scenario: #1 - 25% or less Contolled Traffic

Scenario Description:

This practice must be part of a conservation management system to: Improve soil health; Improve soil productivity; Improve water infiltration and reduce excessive runoff; And/or reduce energy consumption. This practice payment considers the time needed to modify equipment, acquire the technical knowledge and skills necessary to effectively implement a controlled traffic farming system on a typical 200 ac. cropland farm. Must utilize RTK automatic steering technology for high load field traffic. Payment is based on the percentage of wheel traffic achieved. This scenario represents the costs associated with reducing the amount of surface area tracked to 25% 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 contolled, up to 85% of the field is tracked causing significant long term compaction. Before the practice is installed traffic is uncontrolled tracking 85% of the field causing compaction, poor infiltration, and high runoff.

After Situation:

After the practice is installed, traffic is reduced to 25% of the field or less reducing compaction, increasing infiltration, and reducing runoff.

Scenario Feature Measure: Acre

Scenario Unit: Acre

Scenario Typical Size: 200

Scenario Cost: \$11,370.94

Scenario Cost/Unit: \$56.85

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$44.18	1	\$44.18
Equipment/Installation						
Real Time Kinematic (RTK) Satellite Navigation Equipment Rental	2631	Rental for Survey Grade GPS/GNSS RTK unit used in land survey and in construction control.	Hour	\$40.96	115	\$4,710.40
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	\$31.19	200	\$6,238.00
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	\$94.59	4	\$378.36

Practice: 720 - Controlled Traffic Farming

Scenario: #2 - 26% - 35% Controlled Traffic

Scenario Description:

This practice must be part of a conservation management system to: Improve soil health; Improve soil productivity; Improve water infiltration and reduce excessive runoff; And/or reduce energy consumption. This practice payment considers the time needed to modify equipment, acquire the technical knowledge and skills necessary to effectively implement a controlled traffic farming system on a typical 200 ac.cropland farm. Must utilize RTK automatic steering technology for high load field traffic. Payment is based on the percentage of wheel traffic achieved. This scenario represents the costs associated with reducing the amount of surface area tracked to 26-35%. 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 significant long term compaction. Before the practice is installed traffic is uncontrolled tracking 85% of the field causing compaction, poor infiltration, and high runoff.

After Situation:

After the practice is installed, traffic is reduced to 26-35% of the field reducing compaction, increasing infiltration, and reducing runoff.

Scenario Feature Measure: Acre

Scenario Unit: Acre

Scenario Typical Size: 200

Scenario Cost: \$10,123.34

Scenario Cost/Unit: \$50.62

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$44.18	1	\$44.18
Equipment/Installation						
Real Time Kinematic (RTK) Satellite Navigation Equipment Rental	2631	Rental for Survey Grade GPS/GNSS RTK unit used in land survey and in construction control.	Hour	\$40.96	115	\$4,710.40
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	\$31.19	160	\$4,990.40
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	\$94.59	4	\$378.36

Practice: 720 - Controlled Traffic Farming

Scenario: #3 - 36% - 50% Contolled Traffic

Scenario Description:

This practice must be part of a conservation management system to: Improve soil health; Improve soil productivity; Improve water infiltration and reduce excessive runoff; And/or reduce energy consumption. This practice payment considers the time needed to modify equipment, acquire the technical knowledge and skills necessary to effectively implement a controlled traffic farming system on a typical 200 ac. cropland farm. Must utilize RTK automatic steering technology for high load field traffic. Payment is based on the percentage of wheel traffic achieved. This scenario represents the costs associated with reducing the amount of surface area tracked to 36-50%. 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 contolled, up to 85% of the field is tracked causing significant long term compaction. Before the practice is installed traffic is uncontrolled tracking 85% of the field causing compaction, poor infiltration, and high runoff.

After Situation:

After the practice is installed, traffic is reduced to 36-50% of the field reducing compaction, increasing infiltration, and reducing runoff.

Scenario Feature Measure: Acre

Scenario Unit: Acre

Scenario Typical Size: 200

Scenario Cost: \$9,125.26

Scenario Cost/Unit: \$45.63

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$44.18	1	\$44.18
Equipment/Installation						
Real Time Kinematic (RTK) Satellite Navigation Equipment Rental	2631	Rental for Survey Grade GPS/GNSS RTK unit used in land survey and in construction control.	Hour	\$40.96	115	\$4,710.40
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	\$31.19	128	\$3,992.32
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	\$94.59	4	\$378.36

Practice: 747 - Denitrifying Bioreactor

Scenario: #1 - 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, a soil cover, two water control structures (to allow management of the flow rate and 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, a soil cover, two water control structures (to allow management of the flow rate and 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).

Scenario Feature Measure: Volume of Carbon Source

Scenario Unit: Cubic Yard

Scenario Typical Size: 222

Scenario Cost: \$13,470.93

Scenario Cost/Unit: \$60.68

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 24" x 60"	1460	Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling.	Foot	\$3.54	50	\$177.00
Aggregate, Wood Chips	1098	Includes materials, equipment and labor	Cubic yard	\$22.58	222	\$5,012.76
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	\$3.44	200	\$688.00
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	\$2.25	333	\$749.25
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.38	807	\$1,920.66
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	\$20.81	16	\$332.96
Materials						
Pipe, HDPE, CPT, Double Wall, Soil Tight, 6"	1992	Pipe, Corrugated HDPE Double Wall, 6" diameter with soil tight joints - AASHTO M252. Material cost only.	Foot	\$2.51	90	\$225.90

Materials

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	\$11.96	60	\$717.60
Water Level Control Structure, Inline, 2 Baffle, 10" diameter	2021	Inline Inlet WCS 6' High x 10" Dia.connections , 2 baffle (3 compartments)	Each	\$1,915.78	1	\$1,915.78
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	\$5.52	40	\$220.80
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	\$309.67	1	\$309.67

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	\$475.70	2	\$951.40
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$249.15	1	\$249.15

Practice: 798 - Seasonal High Tunnel for Crops

Scenario: #1 - Seasonal High Tunnel

Scenario Description:

A manufactured frame of tubular steel covered with 4-year 6mil 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, plant condition, and energy use.

After Situation:

A gothic style seasonal high tunnel (30 x 72 ft.) has been installed and the growing season has been extended for 1-4 months on average. The gothic style is encouraged to hedge against possible failure under snow loads. Plant health and vigor is improved and there is decreased energy use by producing food locally.

Scenario Feature Measure: Area of Tunnel Installed

Scenario Unit: Square Foot

Scenario Typical Size: 2,160

Scenario Cost: \$10,909.60

Scenario Cost/Unit: \$5.05

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.81	80	\$1,664.80
Materials						
Hoop House, gothic style, base package	1278	Includes heavy-duty, gothic framework complete with all predrilled steel, hardware and instructions. Includes 6 mil 4-year polyethylene film to cover tunnel, roll-up sides, lumber, and polylock for sides and ends for a gothic style (peaked top) hoop house. Materials only, does not include labor.	Square Foot	\$4.28	2160	\$9,244.80

Practice: 801 - Amending Soil Properties with Gypsiferous Products

Scenario: #1 - Amending Soil Properties with Gypsiferous Products at a low rate

Scenario Description:

This is the description for low rate gypsum application to improve surface water quality:
 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. This scenario includes the cost of material and application cost.
 Addressed resource concern is water quality. Associated practices are 590 – Nutrient Management, 328 – Conservation Crop Rotation, 340 – Cover Crop, 329 – Residue and Tillage Management, No-till.

Before Situation:

Cropland that has been in continuous production that has relatively low organic matter and moderately high clay content. The soil in these fields have poor soil structure, susceptible to soil crusting and as a result of long term reduced tillage systems tend to 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 application of gypsum to the field based on these existing soil samples will result in reduce runoff and improve runoff 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.

Scenario Feature Measure: Acres with a gypsiferous product application

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: \$1,497.50

Scenario Cost/Unit: \$37.44

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$9.36	40	\$374.40
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	\$38.65	2	\$77.30
Materials						
Gypsum, Ground Ag Grade, Bulk	1224	Agricultural grade quarry ground gypsum (CaCO4) for dispersive soil treatment. Materials and delivery only.	Ton	\$34.86	30	\$1,045.80

Practice: 801 - Amending Soil Properties with Gypsiferous Products

Scenario: #2 - Amending Soil Properties with Gypsiferous Products at a high rate

Scenario Description:

This is the description for high rate gypsum application to improve surface water quality:
 In combination with an implemented nutrient management plan the producer will use a current soil test result to determine the correct application rate of gypsum to improve soil surface structure and reduce concentration of dissolved reactive phosphorus (DRP) in runoff where STP is high or manure is applied. This scenario includes the cost of material and application cost. Addressed resource concern is water quality. Associated practices are 590 – Nutrient Management, 328 – Conservation Crop Rotation, 340 – Cover Crop, 329 – Residue and Tillage Management, No-till.

Before Situation:

Cropland that has been in continuous production that has relatively low organic matter and high clay content. The soil in these fields have poor soil structure, susceptible to soil crusting and as a result of long term reduced tillage systems tend to 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 application of gypsum to the field based on these existing soil samples will result in reduce runoff and improve runoff 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.

Scenario Feature Measure: Acres with a gypsiferous product application

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: \$2,543.30

Scenario Cost/Unit: \$63.58

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$9.36	40	\$374.40
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	\$38.65	2	\$77.30
Materials						
Gypsum, Ground Ag Grade, Bulk	1224	Agricultural grade quarry ground gypsum (CaCO4) for dispersive soil treatment. Materials and delivery only.	Ton	\$34.86	60	\$2,091.60