

**Practice:** 472 - Access Control

**Scenario:** #1 - Monitoring and maintenance of sensitive areas

**Scenario Description:** Labor and increased time needed to control and re-route animals and traffic from sensitive areas, monitor and maintain barriers. Resource concerns include Excessive sediment in surface waters, Habitat degradation for fish and wildlife, and Undesirable plant productivity and health.

**Before Situation:** The application of access control has resulted in increased labor and time to re-route traffic and animals from a riparian area that splits a field in half. This has also lead to more time and labor in monitoring the animals, inspecting and repairing the barrier.

**After Situation:** Water quality is maintained, habitat is improved, and plant health is maintained by controlling access to the riparian area.

**Scenario Feature Measure:** Area of sensitive area

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$509.96

**Scenario Cost/Unit:** \$509.96

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Gate, Pipe, 12'	1057	6 rail tube gate, 16 gauge. Includes materials and shipping only.	Each	\$166.29	1	\$166.29
Post, Wood, CCA treated, 5" x 8'	11	Wood Post, End 5" X 8', CCA Treated. Includes materials and shipping only.	Each	\$11.26	2	\$22.52

**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	\$21.64	5	\$108.22
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**Equipment Installation**

Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	3	\$76.94
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**Foregone Income**

FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	\$16.00	8.5	\$135.98
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**Practice:** 560 - Access Road

**Scenario:** #1 - Constructed road with Heavy Stone Base and Geotextile

**Scenario Description:** A compacted stone road is constructed on relatively level terrain. Poor sub-base material and/or seasonal water table issues require geotextile to keep material from pumping in stone. A properly constructed, well-defined access road addresses resource concerns related to compaction, emissions of fugitive dust, and excessive sediment in surface water. Proper dust control measures are taken during construction to reduce short-term air quality deterioration. Costs include the excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice. Associated Practices: Critical Area Seeding (342), Diversion (362), Dust Control on Unpaved Roads and Surfaces (373), Land Clearing (460), Obstruction Removal (500), Stream Crossing (578), and Structures for Water Control (587)

**Before Situation:** An agricultural enterprise with equipment and vehicle use has compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions from fugitive dust as a result of not having a fixed travel way. The area is relatively dry and has level terrain with stable soils.

**After Situation:** A road is constructed 14 feet wide with an average cut of 12 inches. The entire length requires additional sub-base stabilization with geotextile and 12 inch rock base with upper zone of compacted finer grade material. Planned grades include all dips and water bars. A properly constructed, well-defined access road reduces or eliminates compaction, emissions of fugitive dust, and excess sediment in surface water by reducing the uncontrolled sediment transport and improving the drainage of irrigated lands.

**Scenario Feature Measure:** Length of Roadway

**Scenario Unit:** Foot

**Scenario Typical Size:** 300

**Total Scenario Cost:** \$8,698.58

**Scenario Cost/Unit:** \$29.00

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$146.00	16	\$2,336.06
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	50	\$243.67
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.66	467	\$1,243.89
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$1.05	50	\$52.27

**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	\$32.34	16	\$517.47
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	\$37.24	6	\$223.43

**Materials**

Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yard	\$21.70	160	\$3,471.41
One Species, Cool Season, Native Perennial Grass	2312	Native, cool season perennial grass. Includes material and shipping only.	Acre	\$161.29	0.05	\$8.06

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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**Practice:** 560 - Access Road

**Scenario:** #2 - Constructed road with Heavy Stone Base

**Scenario Description:** A compacted stone road is constructed on relatively level terrain with no water table issues. A properly constructed, well-defined access road addresses resource concerns related to compaction, emissions of fugitive dust, and excessive sediment in surface water. Proper dust control measures are taken during construction to reduce short-term air quality deterioration. Costs include the excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice. Associated Practices: Critical Area Seeding (342), Diversion (362), Dust Control on Unpaved Roads and Surfaces (373), Land Clearing (460), Obstruction Removal (500), Stream Crossing (578), and Structures for Water Control (587).

**Before Situation:** An agricultural enterprise with equipment and vehicle use has compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions from fugitive dust as a result of not having a fixed travel way. The area is relatively wet and swampy or has unstable, but level terrain.

**After Situation:** A road is constructed 14 feet wide with an average cut of 12 inches. The entire length requires 12 inch rock base with upper zone of compacted finer grade material. Planned grades include all dips and water bars. A properly constructed, well-defined access road reduces or eliminates compaction, emissions of fugitive dust, and excess sediment in surface water by reducing the uncontrolled sediment transport and improving the drainage of irrigated lands.

**Scenario Feature Measure:** Length of Roadway

**Scenario Unit:** Foot

**Scenario Typical Size:** 300

**Total Scenario Cost:** \$6,697.80

**Scenario Cost/Unit:** \$22.33

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$146.00	12	\$1,752.04
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	40	\$194.94
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$1.05	55	\$57.50

**Labor**

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	12	\$388.11
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	\$37.24	6	\$223.43

**Materials**

Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yard	\$21.70	160	\$3,471.41
One Species, Cool Season, Native Perennial Grass	2312	Native, cool season perennial grass. Includes material and shipping only.	Acre	\$161.29	0.05	\$8.06

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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**Practice:** 560 - Access Road

**Scenario:** #3 - Rehabilitation of Existing Road or site with solid base

**Scenario Description:** An existing access road is repaired with 6 inches thick of compacted gravel surface. Existing road or site has a good sub-base on level terrain. A properly repaired, well-defined access road addresses resource concerns related to compaction, emissions of fugitive dust, and excessive sediment in surface water. Proper dust control measures are taken during construction to reduce short-term air quality deterioration. An average rehabilitation costs 35% less than a new installation. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice. Associated Practices: Critical Area Seeding (342), Diversion (362), Dust Control on Unpaved Roads and Surfaces (373), Land Clearing (460), Obstruction Removal (500), Stream Crossing (578), and Structures for Water Control (587).

**Before Situation:** An existing access road is beyond its useful lifespan and can no longer be used as intended without rehabilitation. If access road is left in its current condition, site will continue to degrade with continued compaction, excessive sediment in surface water, and emissions of fugitive dust.

**After Situation:** The road will be restored to a full 14 feet width of 6 inches of compacted gravel surfaces. Minimal grading is required. Planned grades include all dips and water bars. A properly repaired, well-defined access road reduces or eliminates compaction, emissions of fugitive dust, and excess sediment in surface water by reducing the uncontrolled sediment transport and improving the drainage of irrigated lands

**Scenario Feature Measure:** Length of Roadway

**Scenario Unit:** Foot

**Scenario Typical Size:** 300

**Total Scenario Cost:** \$4,333.02

**Scenario Cost/Unit:** \$14.44

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$146.00	8	\$1,168.03
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	78	\$380.13

**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	\$32.34	8	\$258.74
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	\$37.24	6	\$223.43

**Materials**

Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yard	\$21.70	78	\$1,692.31
One Species, Cool Season, Native Perennial Grass	2312	Native, cool season perennial grass. Includes material and shipping only.	Acre	\$161.29	0.05	\$8.06

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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**Practice:** 309 - Agrichemical Handling Facility

**Scenario:** #1 - Agrichemical Storage Mixing & Handling Pad in New building, steep site

**Scenario Description:** This practice scenario is an agrichemical handling facility for storage and mixing and loading operations. Steep site topography mandates that storage and handling area be 2' higher than loading and mixing pad. Include a secured area for chemical storage of 16'x20'. Building is enclosed except for opening to entrance and exit the mixing pad and keeps wind blown rain out. Ventilation not an issue as liquid chemicals used, no powder. This practice addresses water quality degradation and due to mis-handling, storing and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Access Road (560), Pipeline (516), Roof Runoff Management (558), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595)

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

**After Situation:** An agrichemical storage and handling facility is constructed inside an enclosed building. This is a common practice. An agrichemical handling facility for storage and mixing and loading is constructed to a 35' x 40' with an application equipment length of 32 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading with proper storage of associated dry and/or liquid agrichemicals. The concrete is sealed and sloped to a collection sump, facility containment is surrounded by square and ramped curbs. The storage area for rinsate tanks (16' x20') and locked chemical storage (16' x20') is elevated by 2' over the loading pad. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Scenario Feature Measure:** Total Containment Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 1400

**Total Scenario Cost:** \$39,866.57

**Scenario Cost/Unit:** \$28.48

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$65.99	8	\$527.88
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-place 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	\$449.19	10	\$4,491.90
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-place 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	\$288.82	25	\$7,220.49
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	24	\$1,868.39
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	350	\$1,705.70

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	2	\$62.94
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	22	\$683.11
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	\$711.28	1	\$711.28
Door, Steel	2391	Heavy duty fire rated steel door, full panel flush, 18 gauge, 4' x 7'. Materials only.	Each	\$1,044.91	1	\$1,044.91
Emergency shower and eye wash station	1499	Emergency shower and eye wash station unit. Materials only.	Each	\$592.43	1	\$592.43
Painting, concrete surface, impermeable	1497	Painting of concrete surfaces with an impermeable coating. Includes materials and application.	Square Foot	\$0.93	1400	\$1,308.72

Post Frame Building, enclosed 4 sides	1046	Enclosed post frame building, four walls. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, and labor only.	Square Foot	\$9.25	1400	\$12,953.50
Tank, rinsate or chemical storage, > 100 to 300 gal	2050	Poly tank reservoir for storing rinsate or other liquid agrichemicals. Greater than 100 to 300 gallon capacity. Materials only.	Gallon	\$1.44	600	\$861.24
Wall, Interior	2304	Interior partition wall, 10' high, 2" x 4" studs on 16" center, 3/4" plywood sheathing. Includes materials, equipment and labor.	Foot	\$71.18	36	\$2,562.40

#### 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	\$32.34	32	\$1,034.95
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	40	\$865.76

#### Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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	\$83.16	2	\$166.32

**Practice:** 309 - Agrichemical Handling Facility

**Scenario:** #2 - Convert existing building to a storage, handling, and mixing pad

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

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

**After Situation:** An agrichemical storage and handling facility is constructed inside an existing enclosed building. A agrichemical handling facility for storage and mixing and loading is installed with dimensions of 35' x 40' with an application equipment length of 32 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading with proper storage of associated dry and/or liquid agrichemicals. Entire area used is on one elevation. The concrete is sealed and sloped to a collection sump, facility containment is surrounded by square and ramped curbs. Add 3 walls for secure area that is 16' x20'. One side is existing. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Scenario Feature Measure:** Total Containment Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 1400

**Total Scenario Cost:** \$18,903.87

**Scenario Cost/Unit:** \$13.50

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-place 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	\$449.19	6	\$2,695.14
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-place 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	\$288.82	25	\$7,220.49
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	4	\$311.40

**Materials**

Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	14	\$434.71
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	\$711.28	1	\$711.28
Door, Steel	2391	Heavy duty fire rated steel door, full panel flush, 18 gauge, 4' x 7'. Materials only.	Each	\$1,044.91	1	\$1,044.91
Emergency shower and eye wash station	1499	Emergency shower and eye wash station unit. Materials only.	Each	\$592.43	1	\$592.43
Painting, concrete surface, impermeable	1497	Painting of concrete surfaces with an impermeable coating. Includes materials and application.	Square Foot	\$0.93	1400	\$1,308.72
Tank, rinsate or chemical storage, > 100 to 300 gal	2050	Poly tank reservoir for storing rinsate or other liquid agrichemicals. Greater than 100 to 300 gallon capacity. Materials only.	Gallon	\$1.44	600	\$861.24
Wall, Interior	2304	Interior partition wall, 10' high, 2" x 4" studs on 16" center, 3/4" plywood sheathing. Includes materials, equipment and labor.	Foot	\$71.18	36	\$2,562.40

**Labor**

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag	Hour	\$32.34	4	\$129.37
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		Equipment >=150 HP, Scrapers, Water Wagons.				
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	16	\$346.31

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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	\$83.16	1	\$83.16

**Practice:** 309 - Agrichemical Handling Facility

**Scenario:** #3 - Earthen Liquid Agrichemical Storage with a Handling Pad

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

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

**After Situation:** An agrichemical handling facility is constructed for storage of liquid agrichemicals along with a handling pad for mixing and loading operations. The average size of the agrichemical handling facility for proper storage of liquid agrichemicals is in an earthen lined containment with bottom dimensions of 30 ft x 40 ft. A handling pad for mixing and loading is located next to the liquid containment and is 20' x 40' with an application equipment length of 32 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading. The concrete is sealed and sloped to a collection sump. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Scenario Feature Measure:** Floor surface area of Liquid Containment Area + Handling pad

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 2000

**Total Scenario Cost:** \$10,477.88

**Scenario Cost/Unit:** \$5.24

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-place 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	\$449.19	2	\$898.38
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-place 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	\$288.82	15	\$4,332.29
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	4	\$311.40
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	235	\$1,145.26
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	\$2.58	235	\$606.00

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	9	\$283.25
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	13	\$403.66
Painting, concrete surface, impermeable	1497	Painting of concrete surfaces with an impermeable coating. Includes materials and application.	Square Foot	\$0.93	800	\$747.84

**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	\$32.34	4	\$129.37
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**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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	\$83.16	4	\$332.64
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	\$83.16	1	\$83.16

**Practice:** 309 - Agrichemical Handling Facility

**Scenario:** #4 - Fabricated Liquid Agrichemical Storage with a Handling Pad

**Scenario Description:** This practice scenario is an agrichemical handling facility for storage of liquid agrichemicals along with a mixing and loading pad. Due to topography, limited site space and/or geological conditions a fabricated, lined structure is needed for liquid storage area. No roof. This practice addresses water quality degradation and due to mis-handling, storing, and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Access Road (560), Pipeline (516), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595), Pond Sealing or Lining Flexible Membrane (521A)

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

**After Situation:** An agrichemical handling facility is constructed for storage of liquid agrichemicals along with a handling pad for mixing and loading operations. The average size of the agrichemical handling facility for proper storage of liquid agrichemicals is in fabricated containment that is 30 ft x 40 ft with flexible membrane lined walls. The walls are of modular blocks stacked two for a 4ft wall height on four sides. A handling pad for mixing and loading is located next to the liquid containment and is 16' x 32' with an application equipment length of 24 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading. The concrete is sealed and sloped to a collection sump. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Scenario Feature Measure:** Liquid Containment Area + Handling Pad

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 1712

**Total Scenario Cost:** \$35,278.52

**Scenario Cost/Unit:** \$20.61

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	8	\$3,593.52
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	\$288.82	19	\$5,487.57
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	6	\$467.10
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	2	\$9.75
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.66	2024	\$5,391.07

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	4	\$125.89
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	27	\$838.37
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery.	Cubic Yard	\$99.59	42	\$4,182.83
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	\$711.28	1	\$711.28
Painting, concrete surface, impermeable	1497	Painting of concrete surfaces with an impermeable coating. Includes materials and application.	Square Foot	\$0.93	512	\$478.62
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	\$6.12	2024	\$12,380.94

**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	\$32.34	6	\$194.05
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	2	\$46.59

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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	\$83.16	2	\$166.32

**Practice:** 309 - Agrichemical Handling Facility

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

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

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

**After Situation:** An agrichemical handling facility is constructed for storage of liquid agrichemicals along with a roofed building to store dry agrichemicals with a handling pad for mixing and loading operations. The average size of the agrichemical handling facility for proper storage of liquid agrichemicals is in an earthen lined containment with bottom dimensions of 60 ft x 40 ft. A roofed building for dry agrichemicals and handling pad for mixing and loading is located next to the liquid containment and is 30' x 40' with an application equipment length of 32 ft. The handling pad for mixing and loading operations is roofed and sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading. The concrete is sealed and sloped to a collection sump, facility containment has at least two sides constructed of 5 ft post and plank walls. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Scenario Feature Measure:** Floor surface area of Liquid Containment Area + Handling pad

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 3600

**Total Scenario Cost:** \$39,770.38

**Scenario Cost/Unit:** \$11.05

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	23	\$10,331.37
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	\$288.82	1.5	\$433.23
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	8	\$622.80
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	380	\$1,851.91
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	380	\$979.91

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	36	\$1,133.00
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	19	\$589.96
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	\$0.93	853	\$790.82
Painting, concrete surface, impermeable	1497	Painting of concrete surfaces with an impermeable coating. Includes materials and application.	Square Foot	\$0.93	1200	\$1,121.76
Roof, Post Frame Building, 30' to 60' wide	1676	Post Frame Building, no sides, - 30' to 60' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation	Square Foot	\$8.46	2000	\$16,920.00

		preparation.				
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**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	\$32.34	8	\$258.74
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	120	\$2,597.29

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	6	\$1,806.95
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	\$83.16	4	\$332.64

**Practice:** 309 - Agrichemical Handling Facility

**Scenario:** #6 - Agrichemical Handling Pad for mixing and loading only

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

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

**After Situation:** This scenario is an agrichemical handling facility pad for mixing and loading operations. The average size of the agrichemical handling pad for mixing and loading is 16' x 40' with an application equipment length of 32 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading. The concrete is sealed and sloped to a collection sump, containment of the pad is surrounded by sloped and ramped reinforced concrete. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Scenario Feature Measure:** Total Containment Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 640

**Total Scenario Cost:** \$10,577.63

**Scenario Cost/Unit:** \$16.53

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$65.99	4	\$263.94
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	\$288.82	15	\$4,332.29
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	12	\$934.19

**Materials**

Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	10	\$310.51
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	\$711.28	1	\$711.28
Emergency shower and eye wash station	1499	Emergency shower and eye wash station unit. Materials only.	Each	\$592.43	1	\$592.43
Painting, concrete surface, impermeable	1497	Painting of concrete surfaces with an impermeable coating. Includes materials and application.	Square Foot	\$0.93	640	\$598.27
Pump, Sump, less than 1/4 HP	2582	Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor).	Each	\$169.36	1	\$169.36
Tank, rinsate or chemical storage, > 100 to 300 gal	2050	Poly tank reservoir for storing rinsate or other liquid agrichemicals. Greater than 100 to 300 gallon capacity. Materials only.	Gallon	\$1.44	300	\$430.62

**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	\$32.34	16	\$517.47
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	16	\$346.31

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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	\$83.16	2	\$166.32

**Practice:** 309 - Agrichemical Handling Facility

**Scenario:** #7 - Agrichemical Storage & Handling, portable pads in existing Bldg

**Scenario Description:** This practice scenario is an agrichemical storage and handling facility for mixing and loading operations within an existing structure. Floor containment is not suitable for containment, must use portable structures for spill or leak collection. This practice addresses water quality degradation and due to mis-handling, storing, and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Pipeline (516), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595)

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

**After Situation:** This scenario is an agrichemical handling facility storage an impermeable barrier poly pad for mixing and loading operations. The average size of the agrichemical handling storage is for a pallet drum on a 5 ft x 5 ft containment pallet with sump capacity included. A poly pad is used for mixing and loading that is 8ft x 8ft with an application equipment length of 4 ft. The portable handling pad is used for mixing and loading operations with small hand held sprayers. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Scenario Feature Measure:** Storage Containment Area + Handling pad

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 89

**Total Scenario Cost:** \$1,838.80

**Scenario Cost/Unit:** \$20.66

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Labor**

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	8	\$173.15
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**Materials**

2 Drum Spill Pallet, 66 Gallon	1610	Pre fabricated containment basin with a capacity of approximately 66 gal. Materials only.	Each	\$290.20	1	\$290.20
PVC Containment Basin, 6' x 6'	1611	Poly containment basin typically 8" to 12" deep with area dimensions in the range of 6' x 6' or larger.	Square Foot	\$21.49	64	\$1,375.45

**Practice:** 309 - Agrichemical Handling Facility

**Scenario:** #8 - Agrichemical Handling Pad with roof for mixing and loading no storage

**Scenario Description:** This practice scenario is an agrichemical handling facility for mixing and loading operations. Scenario does not include storage. This practice addresses water quality degradation and due to mis-handling, and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Access Road (560), Pipeline (516), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595)

**Before Situation:** Operator has secure storage for agrichemicals but lacks a suitable area for mixing and loading. Spills or overflows of agrichemicals contaminate the soil, runoff to surface waters and leaching to ground water.

**After Situation:** This scenario is an agrichemical handling facility pad for mixing and loading operations. The average size of the agrichemical handling pad for mixing and loading is 16' x 40' with an application equipment length of 32 ft. Roof width extends 4' out of each side for an area of 24'x 40. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading with a wood and truss roof but no walls. The concrete is sealed and sloped to a collection sump, containment of the pad is surrounded by sloped and ramped reinforced concrete. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Scenario Feature Measure:** Area of pad

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 640

**Total Scenario Cost:** \$18,699.23

**Scenario Cost/Unit:** \$29.22

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$65.99	4	\$263.94
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	\$288.82	15	\$4,332.29
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	12	\$934.19

**Materials**

Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	10	\$310.51
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	\$711.28	1	\$711.28
Emergency shower and eye wash station	1499	Emergency shower and eye wash station unit. Materials only.	Each	\$592.43	1	\$592.43
Painting, concrete surface, impermeable	1497	Painting of concrete surfaces with an impermeable coating. Includes materials and application.	Square Foot	\$0.93	640	\$598.27
Pump, Sump, less than 1/4 HP	2582	Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor).	Each	\$169.36	1	\$169.36
Roof, Post Frame Building, 30' to 60' wide	1676	Post Frame Building, no sides, - 30' to 60' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation preparation.	Square Foot	\$8.46	960	\$8,121.60
Tank, rinsate or chemical storage, > 100 to 300 gal	2050	Poly tank reservoir for storing rinsate or other liquid agrichemicals. Greater than 100 to 300 gallon capacity. Materials only.	Gallon	\$1.44	300	\$430.62

**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	\$32.34	16	\$517.47
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	16	\$346.31

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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	\$83.16	2	\$166.32

**Practice:** 309 - Agrichemical Handling Facility

**Scenario:** #9 - Agrichemical Storage & Handling Pad in New building

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

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

**After Situation:** An agrichemical storage and handling facility is constructed inside a new building. A agrichemical handling facility for storage and mixing and loading is installed with dimensions of 35' x 40' with an application equipment length of 32 ft x 16' wide. Remaining area used for rinsate tank storage with a 14' x 20' area walled to secure chemicals. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading with proper storage of associated dry and/or liquid agrichemicals. Entire area used is on one elevation. The concrete is sealed and sloped to a collection sump, facility containment is surrounded by square and ramped curbs. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Scenario Feature Measure:** Total Pad Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 1400

**Total Scenario Cost:** \$33,092.10

**Scenario Cost/Unit:** \$23.64

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$65.99	4	\$263.94
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-place 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	\$288.82	25	\$7,220.49
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	12	\$934.19

**Materials**

Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	14	\$434.71
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	\$711.28	1	\$711.28
Door, Steel	2391	Heavy duty fire rated steel door, full panel flush, 18 gauge, 4' x 7'. Materials only.	Each	\$1,044.91	1	\$1,044.91
Emergency shower and eye wash station	1499	Emergency shower and eye wash station unit. Materials only.	Each	\$592.43	1	\$592.43
Painting, concrete surface, impermeable	1497	Painting of concrete surfaces with an impermeable coating. Includes materials and application.	Square Foot	\$0.93	1400	\$1,308.72
Pump, Sump, less than 1/4 HP	2582	Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor).	Each	\$169.36	1	\$169.36
Roof, Post Frame Building, 30' to 60' wide	1676	Post Frame Building, no sides, - 30' to 60' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation preparation.	Square Foot	\$8.46	1400	\$11,844.00
Tank, rinsate or chemical storage, > 100 to 300 gal	2050	Poly tank reservoir for storing rinsate or other liquid agrichemicals. Greater than 100 to 300 gallon capacity. Materials only.	Gallon	\$1.44	600	\$861.24

Wall, Exterior, Metal	2305	Exterior wall, 2" x 4" studs on 24" center, 30 gauge galvanized steel sheeting, and one pre-hung door. Includes materials, equipment and labor.	Foot	\$89.77	34	\$3,052.05
Wall, Interior	2304	Interior partition wall, 10' high, 2" x 4" studs on 16" center, 3/4" plywood sheathing. Includes materials, equipment and labor.	Foot	\$71.18	34	\$2,420.05

**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	\$32.34	16	\$517.47
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	16	\$346.31

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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	\$83.16	2	\$166.32

**Practice:** 309 - Agrichemical Handling Facility

**Scenario:** #10 - Dry, Bulk Storage in Roofed Concrete Bins

**Scenario Description:** This practice scenario is an agrichemical handling facility for storage of bulk, dry agrichemicals. The storage area consists of two bins. The facility is roofed and enclosed by three wall. The open side of the bins is secured by overhead doors. This practice addresses water quality degradation and due to mis-handling, storing, and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Access Road (560), Nutrient Management (590), Pest Management (595),

**Before Situation:** Dry, bulk agrichemicals are dumped directly on the ground and temporarily stored in a stockpile at the edge of the field. The Operator loads the agrichemicals and fills the spreader equipment over the spring planting season. The stockpile is subject to foul weather conditions. Rainfall falling on the stockpile can runoff to a nearby surface water. Leachate from the stockpile can contaminate the soil and groundwater.

**After Situation:** This scenario is an agrichemical handling facility for the storage of dry, bulk agrichemicals in an enclosed facility. The typical size of the storage facility is 24' x 30', made up of two bays 12' x 30'. The storage bays consist of a concrete pad with concrete retaining walls on three sides. The walls are 8 ft high and 8" thick with spread footings. The interior concrete slab is 6" thick; whereas the footings are 12" thick. The roof structure is of post and beam timber construction with the posts set on top of the concrete walls. The eave height is up to 20 feet to accommodate equipment. Wall sheathing extends from the top of the concrete wall to the roof structure. One side is open for access where a rolled curb and two overhead doors prevent rainwater from entering the storage area. A working pad is required in front of the facility to permit loading and unloading, but is to be included under Heavy Use Area Protection.

**Scenario Feature Measure:** Total Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 720

**Total Scenario Cost:** \$35,173.69

**Scenario Cost/Unit:** \$48.85

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	40	\$17,967.60
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	\$288.82	9	\$2,599.37
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	12	\$934.19
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	48	\$233.93

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	26	\$818.28
Door, Steel	2391	Heavy duty fire rated steel door, full panel flush, 18 gauge, 4' x 7'. Materials only.	Each	\$1,044.91	2	\$2,089.82
Fan, exhaust, 18" High Efficiency	2356	18 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials and shipping only. Exhaust fan, controls, wiring and associated appurtenances (excludes installation) Ventilation - Exhaust Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS lab or the Air Movement and Control Association and be in top 20 percentile of fans tested.	Each	\$550.08	1	\$550.08
Painting, concrete surface, impermeable	1497	Painting of concrete surfaces with an impermeable coating. Includes materials and application.	Square Foot	\$0.93	1872	\$1,749.95
Post Frame Building, enclosed 4 sides	1046	Enclosed post frame building, four walls. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous	Square Foot	\$9.25	720	\$6,661.80

		closely spaced obstructions). Includes materials, shipping, and labor only.				
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**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	\$32.34	12	\$388.11
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	8	\$173.15

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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	\$202.55	2	\$405.11

**Practice:** 591 - Amendments for the Treatment of Agricultural Waste

**Scenario:** #1 - Litter Amendments for Air Quality With Partially Treated Brood Chamber, 4 applications per year

**Scenario Description:** This practice scenario includes the application of a litter treatment amendment that is approved by NRCS to the entire poultry house to reduce ammonia emissions from the house and facilitate manure management. An entire poultry house is treated year round for air quality impacts. In the winter, the producer or integrator treats the brood chamber between flocks with litter amendments solely for bird health and production. The amount being applied by the producer or integrator in winter months does not meet the air quality resource concerns. Additional litter amendments are added in winter for Air Quality benefits not being applied by the integrator. Litter amendments are applied spring through fall for entire flocks. NRCS is not responsible for the litter amendments already being applied by the integrator for the purposes of production and bird health. The purpose of the practice is to address resource concerns related to air quality impacts due to particulate matter and precursors, and objectionable odors. Associated practices: Nutrient Management (590).

**Before Situation:** No litter amendments are being applied during the spring through fall months. An amendment is being applied at a lower application rate during the winter months, typically half the house and only two flocks. Partial winter application is solely for production purposes and the lower application rate is not enough to address the air quality resource concerns. The operation raises 4 flocks per year and the integrator partially treats 2 flocks in the winter months. Approximately 18.7% of the needed litter amendments are being applied and only during the winter months.

**After Situation:** An NRCS approved amendment is applied between each flock. All flocks are optimally treated with litter amendments year-round. A typical roaster operation with 4 flocks in a 42' x 500' house (21,000 square feet) is treated to reduce the impacts on air quality. Typically 100 pounds of litter amendments per 1000 square feet are applied 4 times annually. The total amendment applied is adjusted by 81.3% to account for the portion of the brood chamber that is receiving partial application during the winter months. The amendment is proven to control the odor, to reduce ammonia emissions from the litter. The selected amendment is applied in conformance with the manufacturer's recommendations and the rates required. The resulting litter contains higher levels of nutrients and nutrient management plans must account for this. Nutrient level testing of the litter and nutrient planning shall be in conformance with CPS Nutrient Management, Code 590. The amendment successfully addresses the air quality impacts from objectionable odors, ammonia emissions, PM and PM precursors and bird health resource concerns. Formula to calculate the number of 1000 SF units: (Square Feet of house) / 1000 SF X (Number of houses) = 21,000 SF / 1000 SF X 1 house X 4 app/yr = 21 units of 1000SF of House

**Scenario Feature Measure:** Per 1000 SF of House per yr.

**Scenario Unit:** 1,000 Square Foot

**Scenario Typical Size:** 21

**Total Scenario Cost:** \$2,386.61

**Scenario Cost/Unit:** \$113.65

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Ag Waste Amendment, sodium bisulfate	1686	Sodium bisulfate poultry litter amendment. NRCS approved for air quality concerns to reduce ammonia emissions from the litter. Includes materials only.	Ton	\$633.39	3.4	\$2,153.54
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**Equipment Installation**

Application of ag waste amendment for poultry litter	2020	Litter amendment application performed in house. Includes equipment, power unit and labor costs.	Ton	\$68.55	3.4	\$233.07
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**Practice:** 591 - Amendments for the Treatment of Agricultural Waste

**Scenario:** #2 - Litter Amendments for Water Quality With Partially Treated Brood Chamber, 4 applications per year

**Scenario Description:** This practice scenario includes the application of a litter treatment amendment that is approved by NRCS to the entire poultry house to reduce ammonia emissions and water-soluble phosphorous in the poultry litter. An entire poultry house is treated year round for air and water quality impacts. In the winter, the producer or integrator treats the brood chamber between flocks with litter amendments solely for bird health and production. The amount being applied by the producer or integrator in winter months does not meet the air and water quality resource concerns. Additional litter amendments are added in winter for Air Quality benefits not being applied by the integrator. Litter amendments are applied spring through fall for entire flocks. NRCS is not responsible for the litter amendments already being applied by the integrator for the purposes of production and bird health. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrients and pathogens and air quality impacts due to particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590).

**Before Situation:** No litter amendments are being applied during the spring through fall months. An amendment is being applied at a lower application rate during the winter months, typically half the house and only two flocks. Partial winter application is solely for production purposes and the lower application rate is not enough to address resource concerns from existing nutrient levels which may contribute to water quality degradation from nutrient runoff and leaching from fields fertilized with poultry litter and cause adverse air quality impacts such as objectionable odors and ammonia emissions.. The operation raises 4 flocks per year and the integrator partially treats 2 flocks in the winter months. Approximately 18.7% of the needed litter amendments are being applied and only during the winter months.

**After Situation:** An NRCS approved amendment is applied between each flock. All flocks are optimally treated with litter amendments year-round. A typical roaster operation with 4 flocks in a 42' x 500' house (21,000 square feet) is treated to reduce the impacts on air and water quality. Typically 100 pounds of litter amendments per 1000 square feet are applied 4 times annually. The total amendment applied is adjusted by 81.3% to account for the portion of the brood chamber that is receiving partial application during the winter months. The amendment is proven to reduce ammonia emissions and soluble phosphorus in the litter. The selected amendment is applied in conformance with the manufacturer's recommendations and the rates required. The resulting litter contains higher levels of nutrients and nutrient management plans must account for this. Nutrient level testing of the litter and nutrient planning shall be in conformance with CPS Nutrient Management, Code 590. The amendment successfully addresses water quality degradation from nutrients in surface and ground water and air quality impacts due to objectionable odors, ammonia emissions, PM and PM precursors and bird health resource concerns. Formula to calculate the number of 1000 SF units: (Square Feet of house) / 1000 SF X (Number of houses) = 21,000 SF / 1000 SF X 1 house = 21 units of 1000SF of House

**Scenario Feature Measure:** Per 1000 SF of House per yr.

**Scenario Unit:** 1,000 Square Foot

**Scenario Typical Size:** 21

**Total Scenario Cost:** \$2,306.80

**Scenario Cost/Unit:** \$109.85

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Ag Waste Amendment, aluminum sulfate, alum	1684	Aluminum sulfate, alum, poultry Litter amendment. NRCS approved for air and water quality concerns to reduce ammonia emissions and soluble phosphorus in the litter. Materials only.	Ton	\$609.92	3.4	\$2,073.74
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**Equipment Installation**

Application of ag waste amendment for poultry litter	2020	Litter amendment application performed in house. Includes equipment, power unit and labor costs.	Ton	\$68.55	3.4	\$233.07
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**Practice:** 591 - Amendments for the Treatment of Agricultural Waste

**Scenario:** #3 - Litter Amendments for Water Quality With Partially Treated Brood Chamber, 5 applications per year

**Scenario Description:** This practice scenario includes the application of a litter treatment amendment that is approved by NRCS to the entire poultry house to reduce ammonia emissions and water-soluble phosphorous in the poultry litter. An entire poultry house is treated year round for air and water quality impacts. In the winter, the producer or integrator treats the brood chamber between flocks with litter amendments solely for bird health and production. The amount being applied by the producer or integrator in winter months does not meet the air and water quality resource concerns. Additional litter amendments are added in winter for Air Quality benefits not being applied by the integrator. Litter amendments are applied spring through fall for entire flocks. NRCS is not responsible for the litter amendments already being applied by the integrator for the purposes of production and bird health. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrients and pathogens and air quality impacts due to particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590).

**Before Situation:** No litter amendments are being applied during the spring through fall months. An amendment is being applied at a lower application rate during the winter months, typically half the house and only two flocks. Partial winter application is solely for production purposes and the lower application rate is not enough to address resource concerns from existing nutrient levels which may contribute to water quality degradation from nutrient runoff and leaching from fields fertilized with poultry litter and cause adverse air quality impacts such as objectionable odors and ammonia emissions.. The operation raises 5 flocks per year and the integrator partially treats 2 flocks in the winter months. Approximately 15% of the needed litter amendments are being applied and only during the winter months.

**After Situation:** An NRCS approved amendment is applied between each flock. All flocks are optimally treated with litter amendments year-round. A typical broiler operation with 5 flocks in a 42' x 500' house (21,000 square feet) is treated to reduce the impacts on air and water quality. Typically 100 pounds of litter amendments per 1000 square feet are applied 5 times annually. The total amendment applied is adjusted by 85% to account for the portion of the brood chamber that is receiving partial application during the winter months. The amendment is proven to reduce ammonia emissions and soluble phosphorus in the litter. The selected amendment is applied in conformance with the manufacturer's recommendations and the rates required. The resulting litter contains higher levels of nutrients and nutrient management plans must account for this. Nutrient level testing of the litter and nutrient planning shall be in conformance with CPS Nutrient Management, Code 590. The amendment successfully addresses water quality degradation from nutrients in surface and ground water and air quality impacts due to objectionable odors, ammonia emissions, PM and PM precursors and bird health resource concerns. Formula to calculate the number of 1000 SF units: (Square Feet of house) / 1000 SF X (Number of houses) = 21,000 SF / 1000 SF X 1 house = 21 units of 1000SF of House

**Scenario Feature Measure:** Per 1000 SF of House per yr.

**Scenario Unit:** 1,000 Square Foot

**Scenario Typical Size:** 21

**Total Scenario Cost:** \$3,053.12

**Scenario Cost/Unit:** \$145.39

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Ag Waste Amendment, aluminum sulfate, alum	1684	Aluminum sulfate, alum, poultry Litter amendment. NRCS approved for air and water quality concerns to reduce ammonia emissions and soluble phosphorus in the litter. Materials only.	Ton	\$609.92	4.5	\$2,744.65
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**Equipment Installation**

Application of ag waste amendment for poultry litter	2020	Litter amendment application performed in house. Includes equipment, power unit and labor costs.	Ton	\$68.55	4.5	\$308.47
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**Practice:** 591 - Amendments for the Treatment of Agricultural Waste

**Scenario:** #4 - Liquid Animal Waste Amendment

**Scenario Description:** This practice scenario includes the treatment of liquid animal waste for odor control. The purpose of the practice is to address resource concerns related to air quality impacts from objectionable odors caused by manure storage in a facility close to a small town. Associated practices: Nutrient Management (590), Waste Storage Facility (313).

**Before Situation:** Before application of the waste amendment, the liquid manure in the storage facility is creating significant odor problems. The producer is receiving complaints from neighbors.

**After Situation:** This practice scenario is applicable for all types of liquid animal waste. A swine operation has been chosen for this scenario example. Typical implementation scenario is a pit under a swine production building for 1180 head of lactating sows, 400 lb each. The pit is 100' x 140' x 8' deep; 1' freeboard and 1' unpumpable sludge reduces working depth to 6'. This scenario is based on the working volume of manure stored and treated per year. The working volume in the manure storage facility is 84,000 cubic feet, and the facility is emptied every 6 months. The resulting total annual working volume of manure to be treated with the amendment is 168,000 cubic feet. An NRCS approved amendment is applied periodically according to manufacturer's instructions, typically on a monthly basis. The manufacturer's recommended dosage is based on the volume of manure added to the waste storage facility between amendment doses. The resulting waste contains higher levels of nutrients, which is accounted for in the nutrient management plan. Nutrient level testing of the liquid manure and nutrient planning is done in conformance with CPS Nutrient Management, Code 590. The amendment is proven to reduce odor by up to 83%, and successfully reduces the objectionable odors on the site. Complaints from neighbors are no longer received.

**Scenario Feature Measure:** Cubic Feet of required manure storage per year

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 168000

**Total Scenario Cost:** \$3,189.86

**Scenario Cost/Unit:** \$0.02

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Labor**

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	6	\$129.86
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**Materials**

Ag Waste Amendment, digestive enzymes, 10 liter container	1688	10 liter container of an organic manure amendment. Liquefied lignite coal. Materials only.	Each	\$90.00	34	\$3,060.00
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**Practice:** 316 - Animal Mortality Facility

**Scenario:** #1 - < 50 CF Incineration Chamber

**Scenario Description:** A manufactured Type IV incinerator is installed to handle less than 350 lbs of average daily mortality for the species and size of operation. A high temperature (greater than 1,300 degrees F) is used for incineration with a secondary combustion or after burner chamber prior to flue discharge. The smallest incinerator that meets capacity is used for the average daily mortality rate (in pounds). The payment is made per unit of actual chamber size obtained from the manufacturer's product literature. This practice addresses resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are also addressed. Non-attainment areas may require higher level of processing such as gasification to meet additional air quality requirements. Associated Practices: Access Road (560), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), and Waste Storage Facility (313).

**Before Situation:** An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:** An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations. Payment includes a concrete slab to set the incinerator on and a fuel tank. The ash materials are stored in suitable containers until land disposal as per the nutrient management plan.

**Scenario Feature Measure:** Incinerator Chamber Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 44

**Total Scenario Cost:** \$12,757.74

**Scenario Cost/Unit:** \$289.95

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-place 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	\$288.82	4	\$1,155.28
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	\$2.58	8	\$20.63
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	\$133.90	1	\$133.90

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	4	\$125.89
Fuel Tank, Anchored	1033	Fuel tank for operating incinerators and/or gasifiers. Materials only.	Gallon	\$3.57	285	\$1,016.50
Incinerator, 200 lbs/day	1624	Poultry and livestock incinerator with an approximate chamber capacity of 200 pounds per day. Includes equipment and after burner only.	Each	\$9,658.29	1	\$9,658.29

**Labor**

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	1	\$23.29
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	1	\$21.64

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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**Practice:** 316 - Animal Mortality Facility

**Scenario:** #2 - 50-100CF Incineration chamber

**Scenario Description:** A manufactured Type IV incinerator is installed to handle 350 to 850 lbs of average daily mortality for the species and size of operation such as a very large poultry or medium sized swine operations. A high temperature (greater than 1,300 degrees F) is used for incineration with a secondary combustion or after burner chamber prior to flue discharge. The smallest incinerator that meets capacity is used for the average daily mortality rate (in pounds). The payment is made per unit of actual chamber size obtained from the manufacturer's product literature. This practice addresses resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are also addressed. Non-attainment areas may require higher level of processing such as gasification to meet additional air quality requirements. Associated Practices: Access Road (560), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), and Waste Storage Facility (313).

**Before Situation:** An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:** An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations. Payment includes a concrete slab to set the incinerator on and a fuel tank. The ash materials are stored in suitable containers until land disposal as per the nutrient management plan.

**Scenario Feature Measure:** Incinerator Chamber Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 55.8

**Total Scenario Cost:** \$14,549.41

**Scenario Cost/Unit:** \$260.74

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-place 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	\$288.82	4	\$1,155.28
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	\$2.58	8	\$20.63
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	\$133.90	1	\$133.90

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	4	\$125.89
Fuel Tank, Anchored	1033	Fuel tank for operating incinerators and/or gasifiers. Materials only.	Gallon	\$3.57	285	\$1,016.50
Incinerator, 400 lbs/day	1625	Poultry and livestock incinerator with an approximate chamber capacity of 400 pounds per day. Includes equipment and after burner only.	Each	\$11,449.96	1	\$11,449.96

**Labor**

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	1	\$23.29
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	1	\$21.64

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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**Practice:** 316 - Animal Mortality Facility

**Scenario:** #3 - >100 CF Incineration Chamber

**Scenario Description:** A manufactured Type IV incinerator is installed to handle a single 1,200 to 1,500 lb mortality (a single cow or multiple heifers or swine). A high temperature (greater than 1,300 degrees F) is used for incineration with a secondary combustion or after burner chamber prior to flue discharge. The smallest incinerator that meets capacity is used to handle the largest individual mortality. This type of incinerator typically uses a very small footprint, but requires 15-20 gallons of diesel fuel per fill. In order to be cost effective, the usage needs to be significant unless regulations or severe site limitations require this type of facility. The payment is made per unit of actual chamber size obtained from the manufacturer's product literature. This practice addresses resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are also addressed. Non-attainment areas may require higher level of processing such as gasification to meet additional air quality requirements. Associated Practices: Access Road (560), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), and Waste Storage Facility (313).

**Before Situation:** An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:** An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations. Payment includes a concrete slab to set the incinerator on and a fuel tank. The ash materials are stored in suitable containers until land disposal as per the nutrient management plan.

**Scenario Feature Measure:** Incineration Chamber Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 119.6

**Total Scenario Cost:** \$16,412.32

**Scenario Cost/Unit:** \$137.23

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-place 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	\$288.82	4	\$1,155.28
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	\$2.58	8	\$20.63
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	\$133.90	1	\$133.90

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	4	\$125.89
Fuel Tank, Anchored	1033	Fuel tank for operating incinerators and/or gasifiers. Materials only.	Gallon	\$3.57	285	\$1,016.50
Incinerator, 600 lbs/day	1626	Poultry and livestock incinerator with an approximate chamber capacity of 600 pounds per day. Includes equipment and after burner only.	Each	\$13,312.87	1	\$13,312.87

**Labor**

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	1	\$23.29
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	1	\$21.64

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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**Practice:** 316 - Animal Mortality Facility

**Scenario:** #4 - <700 CF In vessel Rotary Drum

**Scenario Description:** A horizontal rotary drum is installed to compost small poultry and swine facility mortality. The facility can handle between 250 and 600 lbs per day of mortality, plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. The payment quantity is based on the interior volume of the rotary composter in cubic feet of the smallest drum that can process the daily mortality as per manufacturer's recommendations. This practice addresses resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are also addressed. Associated Practices: Access Road (560), Critical Area Planting (342), Diversion (362), Fence (382), Nutrient Management (590), Roofs and Covers (367), Structure for Water Control (587), Subsurface Drain (606), Underground Outlet (620), and Waste Storage Facility (313).

**Before Situation:** An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:** A 5' diameter, 22' long rotary drum is installed on two concrete pads that can process 325 lbs of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel sub-base, and concrete pads and slab at two locations plus small floor and walls to complete composting. Input material reduced by 40-60 percent and put into 4' high, three sided, 20'x 20' concrete bin with 10'x20 concrete pad for secondary composting. Area can be protected by adding Roofs and Covers (367 ) standard. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

**Scenario Feature Measure:** Volume of Drum

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 432

**Total Scenario Cost:** \$43,484.90

**Scenario Cost/Unit:** \$100.66

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	6	\$2,695.14
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	\$142.33	4	\$569.34
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	\$288.82	11	\$3,177.01
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	4	\$10.31

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	8	\$251.78
Composter, drum, 12 CY	1627	12 CY drum composter unit. Total capacity range is 10-19 CY. Includes equipment, operation controls, and shipping. Labor not included.	Each	\$36,615.00	1	\$36,615.00

**Mobilization**

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32
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**Practice:** 316 - Animal Mortality Facility

**Scenario:** #5 - Invessel Rotary Drum=>700 CF

**Scenario Description:** A horizontal rotary drum is installed to compost large poultry and swine facility mortality. The facility can handle between 600 and 1000 lbs per day of mortality, plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. The payment quantity is based on the interior volume of the rotary composter in cubic feet of the smallest drum that can process the daily mortality as per manufacturer's recommendations. This practice addresses resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are also addressed. Associated Practices: Access Road (560), Critical Area Planting (342), Diversion (362), Fence (382), Nutrient Management (590), Roofs and Covers (367), Structure for Water Control (587), Subsurface Drain (606), Underground Outlet (620), and Waste Storage Facility (313).

**Before Situation:** An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:** A 5' diameter, 54' long rotary drum is installed on two concrete pads that can process 810 lbs of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel sub-base, and concrete pads and slab at two locations plus small floor and walls to complete composting. Input material reduced by 40-60 percent and put into 4' high, three sided, 30'x 30' concrete bin with 10'x30 concrete pad for secondary composting. Area can be protected by adding Roofs and Covers (367 ) standard. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

**Scenario Feature Measure:** Volume of Drum

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 1079

**Total Scenario Cost:** \$58,002.35

**Scenario Cost/Unit:** \$53.76

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	9	\$4,042.71
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	\$142.33	6	\$854.01
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	\$288.82	21	\$6,065.21
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	4	\$10.31

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	1	\$31.47
Composter, drum, 28 CY	1628	28 CY drum composter unit. Total capacity range is 20-29 CY. Includes equipment, operation controls, and shipping. Labor not included.	Each	\$46,230.00	1	\$46,230.00

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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	Each	\$83.16	2	\$166.32

		of equipment if all hauled simultaneously.				
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**Practice:** 316 - Animal Mortality Facility

**Scenario:** #6 - Static pile, Earthen pad

**Scenario Description:** An impervious earthen pad is installed to compost large animal mortalities (dairy cow) in a static windrow and single pile. Additional carbon based bulking material is added to facilitate aeration and provide a proper C:N ratio. Piles are turned at least once to achieve another heat cycle prior to land application. Access is infrequent. Vegetation is required for runoff treatment. Resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported to surface and ground water resources are addressed. Air quality impacts related to odors are reduced. Associated Practices: Access Road (560), Composting Facility (317), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Diversion (362), Roofs and Covers (367), Structure for Water Control (378), Subsurface Drain (606), Underground Outlet (620), and Vegetative Treatment Area (635).

**Before Situation:** An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:** A compacted earthen surface 50' x 50' is constructed. The site can handle mortality for a 100 cow dairy with heifers and calves. On site soils can be re-compacted to meet required imperviousness. Sufficient area for processing equipment access is included. The site is located out of drainage areas. Off-site water is diverted and any runoff is spread out into a grassed area or vegetated treatment area. Site preparation includes removal of top 1' and re-compacted. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

**Scenario Feature Measure:** Pad Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 2500

**Total Scenario Cost:** \$2,322.46

**Scenario Cost/Unit:** \$0.93

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	150	\$731.02
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	\$2.58	150	\$386.81

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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**Practice:** 316 - Animal Mortality Facility

**Scenario:** #7 - Static Pile, Gravel Pad

**Scenario Description:** A gravel pad installed on a large dairy (1,000 cows plus heifers) or beef operation with an average daily mortality of 175 lbs/day. The area is sized to compost animal mortality as a static pile or windrow with equipment around materials. Sufficient carbon based bulking material is added to allow natural aeration and a proper C:N ratio. The piles are turned at least once to achieve another heat cycle prior to final disposal (land application). The site is located out of drainage areas. Off-site water is diverted and any runoff spread to a grassed area or vegetated treatment area as per regulations. Resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported to surface and ground water resources are addressed. Air quality impacts related to odors are reduced. Associated Practices: Access Road (560), Composting Facility (317), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), Structure for Water Control (378), Subsurface Drain (606), Underground Outlet (620), and Vegetative Treatment Area (635).

**Before Situation:** An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:** A 60' x 95' gravel surface is constructed to process animal mortality. 8" thick compacted gravel is installed. The typical layout is 18' wide piles with an 8' wide access area around each pile or windrow. Site preparation includes topsoil removal, minimal regrading and compaction, installing geotextile and then gravel. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

**Scenario Feature Measure:** Pad Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 5700

**Total Scenario Cost:** \$8,340.08

**Scenario Cost/Unit:** \$1.46

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	140	\$682.28
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	\$2.58	140	\$361.02
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.66	633	\$1,686.04

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	140	\$4,406.11
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**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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**Practice:** 316 - Animal Mortality Facility

**Scenario:** #8 - Static pile, Concrete Pad

**Scenario Description:** A concrete pad is installed over permeable soils, karst topography, frequently accessed sites, or sites with regulatory requirements to compost large animal mortalities (1000 cows plus heifers) or beef animal mortality with an average daily mortality of 175 lbs per day. The area is sized to compost animal mortality as a static pile or windrow with equipment around materials. Sufficient carbon based bulking material is added to allow natural aeration and a proper C:N ratio. The piles are typically turned at least once to achieve another heat cycle prior to final disposal (land application). The site is located out of drainage areas. Off-site water is diverted and any runoff spread onto a grassed area or vegetated treatment area as per regulations. Resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported to surface and ground water resources are addressed. Air quality impacts related to odors are reduced. Associated Practices: Access Road (560), Composting Facility (317), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), Structure for Water Control (378), Subsurface Drain (606), Underground Outlet (620), and Vegetative Treatment Area (635).

**Before Situation:** An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:** A 60' x 95' concrete surface is constructed to process animal mortality. The concrete is installed 6" thick with light reinforcement on 6" of gravel. The typical layout is 18' wide piles with an 8' wide access area around each pile or windrow. Site preparation includes topsoil removal, minimal regrading and compaction, installing gravel or sand subbase and then concrete. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

**Scenario Feature Measure:** Pad Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 5700

**Total Scenario Cost:** \$36,076.86

**Scenario Cost/Unit:** \$6.33

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$288.82	105.5	\$30,470.45
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	105.5	\$514.15
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	\$2.58	220	\$567.32

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	105.5	\$3,320.32
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**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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**Practice:** 316 - Animal Mortality Facility

**Scenario:** #9 - Static Pile, Concrete with curbs

**Scenario Description:** A concrete pad with curb is installed over permeable soils, karst topography, frequently accessed sites, or sites with regulatory requirements to compost large animal mortalities (1000 cows plus heifers) or beef animal mortality with an average daily mortality of 175 lbs per day. Concrete curbs are required to keep material and liquid from entering nearby streams and waterways. The area is sized to compost animal mortality as a static pile or windrow with equipment around materials. Sufficient carbon based bulking material is added to allow natural aeration and a proper C:N ratio. The piles are typically turned at least once to achieve another heat cycle prior to final disposal (land application). The site is located out of drainage areas. Off-site water is diverted and any runoff spread onto a grassed area or vegetated treatment area as per regulations. Resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported to surface and ground water resources are addressed. Air quality impacts related to odors are reduced. Associated Practices: Access Road (560), Composting Facility (317), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), Structure for Water Control (378), Subsurface Drain (606), Underground Outlet (620), and Vegetative Treatment Area (635).

**Before Situation:** An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:** A 60' x 95' concrete surface is constructed to process animal mortality. The concrete is installed 6" thick with light reinforcement and 8" x 12" curbs on 6" of gravel. The typical layout is 18' wide piles with an 8' wide access area around each pile or windrow. Site preparation includes topsoil removal, minimal regrading and compaction, installing gravel or sand subbase and then concrete. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

**Scenario Feature Measure:** Pad area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 5700

**Total Scenario Cost:** \$38,169.69

**Scenario Cost/Unit:** \$6.70

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	6	\$2,695.14
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	\$288.82	105.5	\$30,470.45
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	105.5	\$514.15
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	\$2.58	220	\$567.32

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	105.5	\$3,320.32
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**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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**Practice:** 316 - Animal Mortality Facility

**Scenario:** #10 - Static pile, Wood Bins

**Scenario Description:** A group of small bins along one side and a long narrow bin on the backside of a concrete pad are installed to compost poultry or small swine mortality in static piles. Sufficient bulking material is added to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed with Roofs and Covers (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Associated Practices: Access Road (560), Critical Area Planting (342), Diversion (362), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), Roof Runoff Structure (558), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620).

**Before Situation:** An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:** An 18' x 40' concrete pad with 4 bins is installed along the front side (5'H x 10'W x 6'L). One 8' wide by 40' long secondary bin is installed. The bin wall is installed with 1' concrete curbing and 4' of treated lumber. A gravel apron is installed on three sides using Heavy Use Area Protection - 561. The roofed portion is addressed using Roofs and Covers 367. Site preparation includes topsoil removal, installing 4" of gravel, setting posts, installing concrete slab, installing wooden walls and doors. Piles turned to go through a second heat cycle prior to final land application. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

**Scenario Feature Measure:** Total Bin Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 720

**Total Scenario Cost:** \$12,707.75

**Scenario Cost/Unit:** \$17.65

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	2.5	\$1,122.98
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	\$288.82	19.25	\$5,559.77
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	\$2.58	38.5	\$99.28

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	19.25	\$605.84
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	\$0.93	880	\$815.86
Lumber, planks, posts and timbers, treated	1609	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.69	448	\$756.33

**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	\$37.24	80	\$2,979.06
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**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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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	\$83.16	2	\$166.32
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**Practice:** 316 - Animal Mortality Facility

**Scenario:** #11 - Static pile, Concrete Bins

**Scenario Description:** Two or more concrete bins, open on one end on a concrete pad, are installed to compost large quantities of poultry or mature swine mortality in static piles. Sufficient bulking material is used to allow natural aeration. Piles are turned to achieve a second heat cycle prior to land application. The roofed portion of the facility is addressed in Cover and Roofs (367). Size of facility based on daily mortality and sizing procedures. Associated Practices: Access Road (560), Critical Area Planting (342), Diversion (362), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), Roof Runoff Structure (558), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620).

**Before Situation:** An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:** A 20' deep by 48' long pad with four bins is installed with 4' high walls and one end open. Due to heavy traffic during the loading and movement from bin to bin, the open side requires a concrete apron, which is done under Heavy Use Area Protection 561. The roofed portion is addressed using Roofs and Covers (367). Site preparation includes topsoil removal, installing 6" of gravel, setting posts, installing concrete slab, and installing 4' high concrete walls. Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

**Scenario Feature Measure:** Total Bin Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 960

**Total Scenario Cost:** \$13,198.25

**Scenario Cost/Unit:** \$13.75

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	15	\$6,737.85
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	\$288.82	18	\$5,198.75
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	36	\$92.83

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	18	\$566.50
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**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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**Practice:** 316 - Animal Mortality Facility

**Scenario:** #12 - Freezer

**Scenario Description:** A manufactured freezer is installed to hold animal mortality. The payment is made per unit. This option is used to manage extremely environmentally sensitive situations and manage mortalities before they can be removed from the farm and handled according to state regulations. Resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported to surface and ground water resources are addressed. Air quality impacts related to odors are reduced. Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).

**Before Situation:** An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:** Animal mortalities are held in a location free from predators before they can be removed to an off-site rendering facility. Mortalities are carried off-site and disposed of according to state regulations. The concrete slab the freezer is set on is included. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

**Scenario Feature Measure:** Freezer

**Scenario Unit:** Each

**Scenario Typical Size:** 5

**Total Scenario Cost:** \$21,105.00

**Scenario Cost/Unit:** \$4,221.00

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$288.82	5	\$1,444.10
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	4	\$210.01

**Labor**

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	4	\$93.18
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**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	\$202.55	1	\$202.55
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**Materials**

Freezer, animal mortality, small	2052	Freezer to hold animal mortalities until rendering services become available or until treated by other processes. Capacity < 75 cubic feet. Includes labor and equipment.	Each	\$3,831.03	5	\$19,155.16
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**Practice:** 314 - Brush Management

**Scenario:** #1 - Hand tools, Woody Vegetation

**Scenario Description:** Using hand tools, such as axes, shovels, hoes, nippers, brush pullers, and including chainsaws to remove or cut off woody plants at or below the root collar. Typical area is moderate rolling to gentle sloping, moderately deep to deep soils that have stands of woody and non herbaceous species that are in the early phases of invasions. Typical unit is 10 acres. Associated Practices: Early Successional Habitat Development and Management (647), Restoration of Rare and Declining Habitats (643), Shallow Water Development and Management (646), Upland Wildlife Habitat Management (645), Wetland Wildlife Habitat Management (644)

**Before Situation:** Area is in the very early phases of woody non herbaceous species encroachment that degrades habitat for desired wildlife species. Future degradation of key forage species and ecological site condition promoting noxious and invasive species and increased soil erosion if woody species are allowed to expand.

**After Situation:** Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition continues to progressing in an upward trend, hydrology and plant health and vigor are sustained.

**Scenario Feature Measure:** Acres treated

**Scenario Unit:** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** \$3,108.10

**Scenario Cost/Unit:** \$310.81

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Labor**

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	50	\$1,082.21
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	\$37.24	25	\$930.96

**Equipment Installation**

Brush Chipper, 6" capacity	938	Brush Chipper, 6" capacity, typically 35 HP. Includes chipper and power unit. Labor not included.	Hour	\$25.01	25	\$625.28
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$5.14	25	\$128.53
Pruning tools, hand tools	1318	Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included.	Hour	\$4.94	25	\$123.52
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	2	\$51.29

**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	\$83.16	2	\$166.32
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**Practice:** 314 - Brush Management

**Scenario:** #2 - Hand Tools and Chemical Treatment

**Scenario Description:** Using a combination of chemical treatment and hand tools, such as axes, shovels, hoes, nippers, brush pullers, and including chainsaws to remove or cut off woody plants at or below the root collar. Typical area is moderate rolling to gentle sloping, moderately deep to deep soils that have stands of woody and non herbaceous species that are in the early phases of invasions. Typical unit is 10 acres. Associated Practices: Early Successional Habitat Development and Management (647), Restoration of Rare and Declining Habitats (643), Shallow Water Development and Management (646), Upland Wildlife Habitat Management (645), Wetland Wildlife Habitat Management (644)

**Before Situation:** Area is in the very early phases of woody non herbaceous species encroachment that degrades habitat for desired wildlife species. Future degradation of key forage species and ecological site condition promoting noxious and invasive species and increased soil erosion if woody species are allowed to expand.

**After Situation:** Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition continues to progressing in an upward trend, hydrology and plant health and vigor are sustained.

**Scenario Feature Measure:** Acres treated

**Scenario Unit:** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** \$4,788.13

**Scenario Cost/Unit:** \$478.81

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Labor**

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	50	\$1,082.21
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	\$37.24	25	\$930.96

**Materials**

Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$40.73	5	\$203.65
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**Equipment Installation**

Brush Chipper, 6" capacity	938	Brush Chipper, 6" capacity, typically 35 HP. Includes chipper and power unit. Labor not included.	Hour	\$25.01	25	\$625.28
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$5.14	25	\$128.53
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	\$69.97	20	\$1,399.44
Pruning tools, hand tools	1318	Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included.	Hour	\$4.94	25	\$123.52
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	2	\$51.29
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	3	\$76.94

**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	\$83.16	2	\$166.32
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**Practice:** 314 - Brush Management

**Scenario:** #3 - Mechanical, Light Equipment

**Scenario Description:** Removal of small woody vegetation of heavy infestations on gentle sloping to moderately deep to deep soils. The practice entails the removal of brush by the use of mechanical cutter, chopper or other light equipment in order to reduce fuel loading and improve ecological site condition. Brush density has exceeded desired levels based on ecological site potential. Only the infestation of the area is treated. Typical unit is 10 acres. Associated Practices: Early Successional Habitat Development and Management (647), Restoration of Rare and Declining Habitats (643), Shallow Water Development and Management (646), Upland Wildlife Habitat Management (645), Wetland Wildlife Habitat Management (644)

**Before Situation:** Area consist of excessive stands of shrub species degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:** Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

**Scenario Feature Measure:** Acres planned

**Scenario Unit:** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** \$1,351.71

**Scenario Cost/Unit:** \$135.17

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Labor**

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	10	\$232.94
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**Equipment Installation**

Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hour	\$61.11	10	\$611.07
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	4	\$102.58

**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	\$202.55	2	\$405.11
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**Practice:** 314 - Brush Management

**Scenario:** #4 - Mechanical, Heavy Equipment

**Scenario Description:** Removal of large woody vegetation of heavy infestations on gentle sloping to moderately deep to deep soils. The practice entails the removal of brush by pushing, grubbing, masticating, chaining then raking or piling in order to reduce fuel loading and improve ecological site condition. Brush density has exceeded desired levels based on ecological site potential. It has been determined that the brush is at the heavy infestation. Only the infestation of the area is treated. Typical unit is 10 acres.

**Before Situation:** Area consist of excessive stands of shrub species degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:** Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

**Scenario Feature Measure:** Acres planned

**Scenario Unit:** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** \$5,425.08

**Scenario Cost/Unit:** \$542.51

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$32.34	40	\$1,293.69
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**Equipment Installation**

Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hour	\$84.38	40	\$3,375.20
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	6	\$153.88

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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**Practice:** 314 - Brush Management

**Scenario:** #5 - Light Mechanical and Chemical

**Scenario Description:** Removal of small woody vegetation of heavy infestations on gentle sloping to moderately deep to deep soils. The practice entails the removal of brush by the use of mechanical cutter, chopper or other light equipment t followed by an application of low cost chemicals in low volumes of material in order to reduce fuel loading and improve ecological site condition. Brush density has exceeded desired levels based on ecological site potential. It has been determined that the brush is at the heavy infestation. Only the infestation of the area is treated.Typical unit is 10 acres.

**Before Situation:** Area consist of excessive stands of shrub species degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:** Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

**Scenario Feature Measure:** Acres planned

**Scenario Unit:** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** \$5,298.16

**Scenario Cost/Unit:** \$529.82

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Labor**

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	30	\$698.82
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**Materials**

Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$15.93	10	\$159.26
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**Equipment Installation**

Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hour	\$69.97	30	\$2,099.16
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hour	\$61.11	30	\$1,833.22
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	4	\$102.58

**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	\$202.55	2	\$405.11
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**Practice:** 314 - Brush Management

**Scenario:** #6 - Chemical, Individual Plant Treatment

**Scenario Description:** This Practice is for the implementation of brush management on range, pasture or native pasture using Individual Plant Treatment (IPT). The typical method of control is application of herbicides (basal or foliar location) on selected individual plants. Associated Practices: Early Successional Habitat Development and Management (647), Restoration of Rare and Declining Habitats (643), Shallow Water Development and Management (646), Upland Wildlife Habitat Management (645), Wetland Wildlife Habitat Management (644)

**Before Situation:** Brush species exceed desired levels resulting in degraded plant condition, loss of forage production, or degraded wildlife habitat. Densities of brush exceed levels indicated in the ecological site descriptions.

**After Situation:** Brush has been treated to a level which results in improved plant condition, forage production, or wildlife habitat. The typical method of control is application of herbicides (basal or foliar location) on selected individual plants.

**Scenario Feature Measure:** Acres treated

**Scenario Unit:** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** \$997.69

**Scenario Cost/Unit:** \$99.77

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$43.40	1	\$43.40
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**Materials**

Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$40.73	2	\$81.46
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**Equipment Installation**

All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	\$38.47	2.5	\$96.18
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	\$69.97	10	\$699.72
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	3	\$76.94

**Practice:** 314 - Brush Management

**Scenario:** #7 - Chemical, Intense Individual Plant Treatment

**Scenario Description:** Individual plant treatment (IPT) is applied to high density, heavy brush for treatment of a sensitive area, such as bog turtle habitat. The typical method of control is application of herbicides (basal or foliar location) on selected individual plants. Associated Practices: Early Successional Habitat Development and Management (647), Restoration of Rare and Declining Habitats (643), Shallow Water Development and Management (646), Upland Wildlife Habitat Management (645), Wetland Wildlife Habitat Management (644)

**Before Situation:** The existing stand consists of unwanted/undesirable species and the stocking rate exceeds the recommended level. Undersirable species consist of hardwoods and shrubs that can propogate via root systems that make commercial control unfeasible.

**After Situation:** Brush has been treated to a level which results in improved plant condition, forage production, or wildlife habitat. The typical method of control is application of herbicides (basal or foliar location) on selected individual plants at a rate of 100 stems per acre.

**Scenario Feature Measure:** Acre treated

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$311.29

**Scenario Cost/Unit:** \$311.29

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$40.73	0.6	\$24.44
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**Equipment Installation**

Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hour	\$69.97	3	\$209.92
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	3	\$76.94

**Practice:** 314 - Brush Management

**Scenario:** #8 - Chemical, Aerial Applied

**Scenario Description:** Apply brush management on 10 acres of rangeland, grazed forest, or pasture thru the use of broadcast aerial application of material with low cost chemical(s) to reduce or remove undesirable deciduous species (brush) in uplands and other areas not in or directly adjacent to streams, ponds, or wetlands.

**Before Situation:** Plant, animal, or wildlife resource concerns associated with uplands and other areas not in or adjacent to stream, ponds, or wetland on grazed range, grazed forest, or pasture which are adversely affected by brush.

**After Situation:** A 10 acre unit of pasture, grazed range, or grazed forest where reduction or removal of undesirable deciduous species have been accomplished by broadcast or spot treatment chemical application to address plant, animal, and wildlife resource concerns.

**Scenario Feature Measure:** Acres planned

**Scenario Unit:** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** \$737.09

**Scenario Cost/Unit:** \$73.71

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$43.40	5	\$216.98
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**Materials**

Herbicide, Picloram	337	Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$18.77	10	\$187.71
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$1.30	10	\$12.96

**Equipment Installation**

Chemical, aerial application, helicopter	1991	Chemical application performed by helicopter on forest only. Includes equipment, mobilization, and labor.	Acre	\$31.94	10	\$319.44
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**Practice:** 672 - Building Envelope Improvement

**Scenario:** #1 - Building Envelope - Attic Insulation

**Scenario Description:** Install a minimum of R-7 insulation in addition to existing attic or ceiling to reduce heat transfer. Increased insulation reduces seasonal heat loss and heat gain which reduces the respective need for heating and cooling equipment to operate.

**Before Situation:** A poultry house with an inefficient building envelope with limited attic insulation.

**After Situation:** A more effective and efficient building envelope can be created through addition of, or increased, attic insulation. Associated practices/activities: 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Scenario Feature Measure:** Area of Attic Insulated

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 20000

**Total Scenario Cost:** \$16,885.42

**Scenario Cost/Unit:** \$0.84

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Insulation, Fiberglass or cellulose, R-15	1196	Fiberglass or cellulose insulation R-15, includes materials, equipment and labor to install.	Square Foot	\$0.84	20000	\$16,885.42
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**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). Based on a 40' x 400' poultry house.

**Before Situation:** A poultry house with an inefficient building envelope with limited wall insulation.

**After Situation:** A more effective and efficient building envelope can be created through addition of, or increased, insulation. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Scenario Feature Measure:** Area of Attic Insulated

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 4500

**Total Scenario Cost:** \$9,260.60

**Scenario Cost/Unit:** \$2.06

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Insulation, Panel, R-11 with sheathing	1197	Insulated wall panel typically 3.5" fiberglass batts (R-11), vapor barrier and OSB sheathing, or equal, includes materials, equipment and labor to install.	Square Foot	\$2.06	4500	\$9,260.60
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**Practice:** 672 - Building Envelope Improvement

**Scenario:** #3 - Building Envelope - Sealant

**Scenario Description:** A typical scenario is sealing the gaps between walls, gables, ceiling, etc. in a poultry house or greenhouse. Sealing is performed by a professional contractor, not merely use of spray foam from a can. The unit basis of payment in this scenario is each house based on 60' x 500' poultry house with an assumed need of sealant to seal 2400 linear feet of gap.

**Before Situation:** An agricultural facility with an inefficient building envelope with gaps between walls, ceiling, etc. for a total of 2400 linear feet.

**After Situation:** A more effective and efficient building envelope can be created through interior sealing of the exterior walls at the footer plate, eaves, ridge cap, and gable ends. The sealant reduces seasonal heat loss and heat gain due to infiltration which reduces the respective need for heating and cooling equipment to operate. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Scenario Feature Measure:** Perimeter of heated structure

**Scenario Unit:** Foot

**Scenario Typical Size:** 2400

**Total Scenario Cost:** \$4,280.46

**Scenario Cost/Unit:** \$1.78

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Sealant	1150	Greenhouse and building gap sealant. Performed by a professional contractor spraying the areas with an approved sealant for poultry production facilities. Includes materials, equipment and labor to install.	Foot	\$1.78	2400	\$4,280.46
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**Practice:** 672 - Building Envelope Improvement

**Scenario:** #4 - Building Envelope - Greenhouse Screens

**Scenario Description:** The mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven strips of aluminum fiber, polyethylene, nylon or other synthetic material. The screen provides a means to better control solar heat gain and heat transfer during night or cold weather conditions to reduce energy use. Screens and similar devices may also be used to divide internal areas and allow for differentiated heating, ventilation, or cooling system operation to reduce energy use.

**Before Situation:** Heating and cooling of an existing greenhouse, or similar structure with conditioned spaces, is inefficient due to poorly regulated heat transfer. A need to regulate an entire space for uniform conditions when some portions have differing, intermittent requirements can also reduce efficiency.

**After Situation:** The greenhouse is fitted with a mechanically controlled energy screen installed truss-to-truss or gutter-to-gutter, with side screens as necessary, reducing heat loss in the greenhouse. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Scenario Feature Measure:** Area of Screen

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 25000

**Total Scenario Cost:** \$49,831.54

**Scenario Cost/Unit:** \$1.99

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$37.24	16	\$595.81
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**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	\$1.97	25000	\$49,235.73
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**Practice:** 672 - Building Envelope Improvement

**Scenario:** #5 - Greenhouse - Insulate Unglazed Walls

**Scenario Description:** A typical scenario is the installation insulation in green house to address energy loss. The insulation can be either of the cellulose or bubble type (or equivalent). The increased insulation reduces seasonal heat loss and heat gain which reduces the respective need for heating and cooling equipment to operate.

**Before Situation:** Green house with standard glazing, plastic or polycarbonate walls and no insulation. Heating and cooling of an existing greenhouse is inefficient due to excessive heat loss.

**After Situation:** The greenhouse is fitted with insulation installed truss-to-truss or gutter-to-gutter and/or non glazed endwalls and/or sidewalls, reducing heat loss and gain in the greenhouse. Associated practices/activities: may include 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Scenario Feature Measure:** Square Feet of insulation

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 25000

**Total Scenario Cost:** \$7,680.51

**Scenario Cost/Unit:** \$0.31

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$37.24	16	\$595.81
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**Materials**

Insulation, Greenhouse, Reflective Bubble	2410	Double bubble reflective insulation with aluminum foil on both sides. Includes materials and shipping only.	Square Foot	\$0.28	25000	\$7,084.70
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**Practice:** 672 - Building Envelope Improvement

**Scenario:** #6 - Spray Foam Insulation

**Scenario Description:** Spray foam insulation is installed to the thickness to the appropriate R value in the walls and the ceilings of a walk-in refrigeration unit. Insulation standards are set by the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) for walk-in coolers. Only coolers used to support on-farm production and storage can be insulated. 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. Payment is based on 1" of insulation material at R-7 value. Additional inches may be required to meet R-25.

**Before Situation:** A walk-in refrigeration unit does not meet the minimum insulation value and results in air leaks and energy inefficiency.

**After Situation:** An application of 1 inch of closed-cell spray foam insulation is installed with a value of R-7. Additional applications of spray foam insulation may be needed to achieve R-25 value, which is the minimum insulation value from ASHRAE standards. The typical application is for a walk-in refrigeration unit 116 feet long by 62 feet wide and 20 feet high. The spray foam insulation is installed on both the walls and ceilings to prevent air leaks and increase energy efficiency. Local building code may require a thermal and/or ignition barrier for all exposed applications. Ceiling applications in climate zones 5 or higher need to address moisture concerns.

**Scenario Feature Measure:** Square foot of surface area of walls and ceilings

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 14312

**Total Scenario Cost:** \$33,984.03

**Scenario Cost/Unit:** \$2.37

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$2.37	14312	\$33,984.03
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**Practice:** 672 - Building Envelope Improvement

**Scenario:** #70 - Wall Insulation Only

**Scenario Description:** Increase insulation value to R-15 by adding insulation to side walls. Based on a 40' x 400' poultry house with 40 feet of cooling pad per house per side. Square footage does not include vents, fans, or door areas.

**Before Situation:** A poultry house with an inefficient building envelope with limited wall insulation.

**After Situation:** A more effective and efficient building envelope can be created through addition of, or increased, insulation. Associated practices/activities: may include 128-AgEMP and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Scenario Feature Measure:** Area of Wall Insulated

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 2642

**Total Scenario Cost:** \$2,230.56

**Scenario Cost/Unit:** \$0.84

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Insulation, Fiberglass or cellulose, R-15	1196	Fiberglass or cellulose insulation R-15, includes materials, equipment and labor to install.	Square Foot	\$0.84	2642	\$2,230.56
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**Practice:** 584 - Channel Bed Stabilization

**Scenario:** #1 - Bioengineering

**Scenario Description:** The bottom and slope of a stream channel is stabilized using bioengineering methods. Bio-engineering methods include live stakes, fascines, plantings, bare-root stock, willow waddles, and live stakes. Re-vegetation of exposed surfaces is completed using Critical Area Planting (342). The typical stream has a 50 foot bottom width and 6 foot banks. The length stabilized is around 100 feet. The entire area is planted at a 2 x 2 grid with live stakes, potted plants, and a bare root mix. Associated practices: (326) Clearing and Snagging, (396 ) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control

**Before Situation:** An existing or newly constructed alluvial bed or threshold channel is accumulating sediment (aggrading) or eroding. The stream channel is unstable causing soil erosion, water quality degradation, excessive sediment, and inadequate habitat for fish and wildlife.

**After Situation:** The stream channel is stabilized and vegetated using bio-engineering methods. Bio-engineering methods include live stakes, fascines, plantings, bare-root stock, willow waddles, and live stakes. The sediment load is decreased and aquatic habitat improved. The water conveyance capacity, storage capacity and flow within the stream are stabilized.

**Scenario Feature Measure:** Area of planting

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 2500

**Total Scenario Cost:** \$10,089.09

**Scenario Cost/Unit:** \$4.04

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Labor**

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	40	\$931.76
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	120	\$2,597.29
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	40	\$1,735.84

**Equipment Installation**

Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$1.05	200	\$209.09
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	\$29.16	40	\$1,166.57

**Materials**

Erosion Control Blanket, biodegradable	1213	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only.	Square Yard	\$1.24	800	\$992.52
One Species, Cool Season, Annual Grass or Legume	2311	Cool season annual grass or legume. Includes material and shipping only.	Acre	\$39.29	0.06	\$2.36
Tree, willow	1426	Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only.	Each	\$0.67	1500	\$1,003.49
Wattles or fascines, 6 to 8 inch diameter	1904	Fascines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 6"-8" diameter. Includes materials and shipping only.	Foot	\$7.25	200	\$1,450.16

**Practice:** 584 - Channel Bed Stabilization

**Scenario:** #2 - Rock structures

**Scenario Description:** The bottom and slope of a stream channel is stabilized using rock rip-rap or engineered products of rock or concrete. Engineered products include, but are not limited to, gabions, rock veins, rock weirs, and concrete blocks. The typical stream has a 50 foot bottom width and 6 foot banks. The stabilized length is 100 feet. Associated practices: (326) Clearing and Snagging, (396 ) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control.

**Before Situation:** An existing or newly constructed alluvial bed or threshold channel is accumulating sediment (aggrading) or eroding. The stream channel is unstable causing soil erosion, water quality degradation, excessive sediment, and inadequate habitat for fish and wildlife. The channel cannot be feasibly stabilized with clearing and snagging, vegetation, bank protection or upstream water control.

**After Situation:** The stream channel is stabilized using rock rip-rap and engineered products. Engineered products include, but are not limited to, gabions, rock veins, rock weirs, and concrete blocks. The sediment load is decreased and aquatic habitat improved. The water conveyance capacity, storage capacity and flow within the stream are stabilized.

**Scenario Feature Measure:** Area to be stabilized.

**Scenario Unit:** Cubic Yard

**Scenario Typical Size:** 575

**Total Scenario Cost:** \$50,826.80

**Scenario Cost/Unit:** \$88.39

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$334.40	0.2	\$66.88
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**Materials**

Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	600	\$49,892.08
Tree, willow	1426	Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only.	Each	\$0.67	200	\$133.80

**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	\$21.64	20	\$432.88
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**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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**Practice:** 584 - Channel Bed Stabilization

**Scenario:** #3 - Wood structures

**Scenario Description:** The bottom and slope of a stream channel is stabilized using engineered wood structures. Structures include, but are not limited to, toe wood, log weirs, log vanes, root wads, and log step pools. Structures are typically spaced at 50 foot intervals. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. The typical stream has a 50 foot bottom width and 6 foot banks. The stabilized length is 100 feet. Associated practices: (342) Critical Area Planting, (326) Clearing and Snagging, (396 ) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control.

**Before Situation:** An existing or newly constructed alluvial bed or threshold channel is accumulating sediment (aggrading) or eroding. The stream channel is unstable causing soil erosion, water quality degradation, excessive sediment, and inadequate habitat for fish and wildlife. The channel cannot be feasibly stabilized with clearing and snagging, vegetation, bank protection or upstream water control.

**After Situation:** The stream channel is stabilized using engineered wood structures. Structures include, but are not limited to, toe wood, log weirs, log vanes, root wads, and log step pools. The sediment load is decreased and aquatic habitat improved. The water conveyance capacity, storage capacity and flow within the stream are stabilized.

**Scenario Feature Measure:** Number of structures

**Scenario Unit:** Each

**Scenario Typical Size:** 3

**Total Scenario Cost:** \$9,054.07

**Scenario Cost/Unit:** \$3,018.02

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	75	\$6,236.51
Wattles or facines, 9 to 12 inch diameter	1905	Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 9"- 12" diameter. Includes materials and shipping only.	Foot	\$12.32	150	\$1,848.65

**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	\$2.58	40	\$103.15
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**Labor**

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	40	\$865.76
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**Practice:** 372 - Combustion System Improvement

**Scenario:** #1 - IC Engine Repower, < 50 bhp

**Scenario Description:** Older diesel engine replaced with new diesel engine repower (30 hp). The existing diesel engine may be stationary or portable operating an irrigation pump or an auxiliary engine providing mechanical function for agricultural/forestry equipment. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:** An old or inefficient diesel engine powers an irrigation pumping plant or grain dryer fan, or is a backup power generation for a farming operation. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR the existing diesel engine is energy inefficient due to a conversion of the irrigation system, reduction in required pump capacity, or age of the power unit. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump, off-road agricultural vehicle or other auxiliary engine providing a mechanical function for agricultural/forestry equipment.

**After Situation:** The repowered diesel engine (30 hp) replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The repower diesel engine will be cleaner-burning and will emit less particulate matter and/or oxides of nitrogen than the previous existing engine. For Energy: Energy efficiency will be improved by at least 20%; the increase in energy efficiency for the modified unit must be supported by an energy analysis.

**Scenario Feature Measure:** Size of Replacement Engine

**Scenario Unit:** Horsepower

**Scenario Typical Size:** 30

**Total Scenario Cost:** \$6,189.94

**Scenario Cost/Unit:** \$206.33

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$37.24	8	\$297.91
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**Materials**

Motor, IC Engine, 25-49 HP	1428	Most current Tier-level Diesel or Cleaner Engine and required appurtenances. 25 to 49 bhp. Materials only.	Horsepower	\$196.40	30	\$5,892.04
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**Practice:** 372 - Combustion System Improvement

**Scenario:** #2 - IC Engine Repower, 50-99 bhp

**Scenario Description:** Older diesel engine replaced with new diesel engine repower (75 hp). The existing diesel engine may be stationary or portable operating an irrigation pump or an auxiliary engine providing mechanical function for agricultural/forestry equipment. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:** An old or inefficient diesel engine powers an irrigation pumping plant or grain dryer fan, or is a backup power generation for a farming operation. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR the existing diesel engine is energy inefficient due to a conversion of the irrigation system, reduction in required pump capacity, or age of the power unit. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump, off-road agricultural vehicle or other auxiliary engine providing a mechanical function for agricultural/forestry equipment.

**After Situation:** The repowered diesel engine (75 hp) replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The repower diesel engine will be cleaner-burning and will emit less particulate matter and/or oxides of nitrogen than the previous existing engine. For Energy: Energy efficiency will be improved by at least 20%; the increase in energy efficiency for the modified unit must be supported by an energy analysis.

**Scenario Feature Measure:** Size of Replacement Engine

**Scenario Unit:** Horsepower

**Scenario Typical Size:** 75

**Total Scenario Cost:** \$15,290.34

**Scenario Cost/Unit:** \$203.87

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$37.24	16	\$595.81
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**Materials**

Motor, IC Engine, 50-99 HP	1429	Most current Tier-level Diesel or Cleaner Engine and required appurtenances. 50 to 99 bhp. Materials only.	Horsepower	\$195.93	75	\$14,694.53
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**Practice:** 372 - Combustion System Improvement

**Scenario:** #3 - IC Engine Repower, 100-199 bhp

**Scenario Description:** Older diesel engine replaced with new diesel engine repower (150 hp). The existing diesel engine may be stationary or portable operating an irrigation pump or an auxiliary engine providing mechanical function for agricultural/forestry equipment. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:** An old or inefficient diesel engine powers an irrigation pumping plant or grain dryer fan, or is a backup power generation for a farming operation. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR the existing diesel engine is energy inefficient due to a conversion of the irrigation system, reduction in required pump capacity, or age of the power unit. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump, off-road agricultural vehicle or other auxiliary engine providing a mechanical function for agricultural/forestry equipment.

**After Situation:** The repowered diesel engine (150 hp) replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The repower diesel engine will be cleaner-burning and will emit less particulate matter and/or oxides of nitrogen than the previous existing engine. For Energy: Energy efficiency will be improved by at least 20%; the increase in energy efficiency for the modified unit must be supported by an energy analysis.

**Scenario Feature Measure:** Size of Replacement Engine

**Scenario Unit:** Horsepower

**Scenario Typical Size:** 150

**Total Scenario Cost:** \$31,921.33

**Scenario Cost/Unit:** \$212.81

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$37.24	16	\$595.81
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**Materials**

Motor, IC Engine, 100-199 HP	1430	Most current Tier-level Diesel or Cleaner Engine and required appurtenances. 100 to 199 bhp. Materials only.	Horsepower	\$208.84	150	\$31,325.52
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**Practice:** 372 - Combustion System Improvement

**Scenario:** #4 - IC Engine Repower, >=200 bhp

**Scenario Description:** Older diesel engine replaced with new diesel engine repower (250 hp). The existing diesel engine may be stationary or portable operating an irrigation pump or an auxiliary engine providing mechanical function for agricultural/forestry equipment. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:** An old or inefficient diesel engine powers an irrigation pumping plant or grain dryer fan, or is a backup power generation for a farming operation. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR the existing diesel engine is energy inefficient due to a conversion of the irrigation system, reduction in required pump capacity, or age of the power unit. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump, off-road agricultural vehicle or other auxiliary engine providing a mechanical function for agricultural/forestry equipment.

**After Situation:** The repowered diesel engine (350 hp) replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The repower diesel engine will be cleaner-burning and will emit less particulate matter and/or oxides of nitrogen than the previous existing engine. For Energy: Energy efficiency will be improved by at least 20%; the increase in energy efficiency for the modified unit must be supported by an energy analysis.

**Scenario Feature Measure:** Size of Replacement Engine

**Scenario Unit:** Horsepower

**Scenario Typical Size:** 250

**Total Scenario Cost:** \$46,650.42

**Scenario Cost/Unit:** \$186.60

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$37.24	16	\$595.81
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**Materials**

Motor, IC Engine, 200-299 HP	1432	Most current Tier-level Diesel or Cleaner Engine and required appurtenances. 200 to 299 bhp. Materials only.	Horsepower	\$184.22	250	\$46,054.61
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**Practice:** 372 - Combustion System Improvement

**Scenario:** #5 - Electric Motor in-lieu of IC Engine, < 12 HP

**Scenario Description:** Replace an existing IC engine operating an irrigation well with a new electric motor (10 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:** Irrigation pump with IC engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:** The 10 HP electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Scenario Feature Measure:** Number of Combustion Units Replaced

**Scenario Unit:** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$1,508.54

**Scenario Cost/Unit:** \$1,508.54

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$37.24	8	\$297.91
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**Materials**

Motor, electric, NEMA Premium, 10 HP	1172	Premium NEMA approved electric motor, 10 Horsepower and all required appurtenances. Includes materials and shipping only.	Each	\$1,210.64	1	\$1,210.64
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**Practice:** 372 - Combustion System Improvement

**Scenario:** #6 - Electric Motor in-lieu of IC Engine, 12-74 HP

**Scenario Description:** Replace an existing IC engine operating an irrigation well with a new electric motor (50 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:** Irrigation pump with IC engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:** The 50 HP electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Scenario Feature Measure:** Number of Combustion Units Replaced

**Scenario Unit:** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$6,568.92

**Scenario Cost/Unit:** \$6,568.92

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$37.24	12	\$446.86
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**Materials**

Motor, electric, NEMA Premium, 50 HP	1173	Premium NEMA approved electric motor, 50 Horsepower and all required appurtenances. Includes materials and shipping only.	Each	\$6,122.06	1	\$6,122.06
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**Practice:** 372 - Combustion System Improvement

**Scenario:** #7 - Electric Motor in-lieu of IC Engine, 75-149 HP

**Scenario Description:** Replace an existing IC engine operating an irrigation well with a new electric motor (100 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:** Irrigation pump with IC engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:** The 100 HP electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Scenario Feature Measure:** Number of Combustion Units Replaced

**Scenario Unit:** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$8,243.40

**Scenario Cost/Unit:** \$8,243.40

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$37.24	16	\$595.81
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**Materials**

Motor, electric, NEMA Premium, 100 HP	1174	Premium NEMA approved electric motor, 100 Horsepower and all required appurtenances. Includes materials and shipping only.	Each	\$7,647.59	1	\$7,647.59
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**Practice:** 372 - Combustion System Improvement

**Scenario:** #8 - Electric Motor in-lieu of IC Engine, 150-299 HP

**Scenario Description:** Replace an existing IC engine operating an irrigation well with a new electric motor (200 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:** Irrigation pump with IC engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:** The 200 HP electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Scenario Feature Measure:** Number of Combustion Units Replaced

**Scenario Unit:** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$24,773.63

**Scenario Cost/Unit:** \$24,773.63

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$37.24	40	\$1,489.53
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**Materials**

Motor, electric, NEMA Premium, 200 HP	1175	Premium NEMA approved electric motor, 200 Horsepower and all required appurtenances. Includes materials and shipping only.	Each	\$23,284.10	1	\$23,284.10
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**Practice:** 372 - Combustion System Improvement

**Scenario:** #9 - Electric Motor in-lieu of IC Engine, >=200 HP

**Scenario Description:** Replace an existing IC engine operating an irrigation well with a new electric motor (400 HP). An existing IC engine is stationary or portable (does not propel a vehicle and is not an auxiliary IC engine on a vehicle). This replacement provides the greatest emission reductions by eliminating NOx, VOC, and PM emissions from the source. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:** Irrigation pump with IC engine withdraws water from a well and provides water through a center pivot irrigation system. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR based on an evaluation of the engine, the pump, the well, and the center pivot irrigation system, the engine is less than 50 percent efficient in delivering water to the system. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump. Plant Condition Impact: Poor plant condition and vigor is evident due to a lack of water during critical times in the growing season. Water Quality Impacts: Fuel tank and fuel line have potential to cause environmental damage with leaks. The existing internal combustion engine is inefficient in delivering water to the system; subsequently, the lack of plant growth and uptake of nutrients, nitrogen and phosphorus are not being fully utilized and are available to be lost to surface and ground waters.

**After Situation:** The 400 HP electric motor replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The electric motor does not produce any on-farm emissions of oxides of nitrogen or particulate matter, resulting in a substantial emissions reduction on the farm. For Energy: Energy efficiency will be improved by at least 20%. For Plant Condition: Plant condition and vigor will be improved. For Water Quality: The potential for environmental damage due to leaks from the tanks and fuel lines has been eliminated. Plant uptake of available nutrients will be increased and less nutrients will be lost to surface and ground waters.

**Scenario Feature Measure:** Number of Combustion Units Replaced

**Scenario Unit:** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$49,211.06

**Scenario Cost/Unit:** \$49,211.06

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$37.24	40	\$1,489.53
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**Materials**

Motor, electric, NEMA Premium, 400 to 499 hp	1439	Premium NEMA approved Electric Motor and required appurtenances. 400 to 499 hp (296 - 372 kW). Includes materials and shipping only.	Horsepower	\$119.30	400	\$47,721.53
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**Practice:** 327 - Conservation Cover

**Scenario:** #1 - Introduced Mix, Field Crop Operation

**Scenario Description:** This practice applies on land to be retired from agricultural production and on other lands needing permanent protective cover. This practice typically involves conversion from a clean-tilled (conventional tilled) intensive cropping system to permanent non-native vegetation. The mix consists of perennial grasses with legumes and/or forbs. The typical size of the practice is 20 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts. Associated Practices: Brush Management (314), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Crops such as corn, soybeans, small grains or vegetables are conventionally grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Soil erosion occurs with visible rills present, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

**After Situation:** Land covered with permanent non-native grass vegetation has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated. Therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** \$9,337.05

**Scenario Cost/Unit:** \$466.85

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes)	2317	Cool season grass and legume mix. Includes material and shipping only.	Acre	\$49.65	20	\$992.93
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$15.93	20	\$318.52
Nitrogen (N), Ammonium Nitrate	69	Price per pound of N supplied by Ammonium Nitrate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.73	800	\$585.50
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.78	1000	\$784.16
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.44	1000	\$435.64

**Equipment Installation**

Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$7.22	20	\$144.43
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$8.09	20	\$161.78
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	20	\$502.83
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	40	\$524.69

**Foregone Income**

FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$271.88	10	\$2,718.84
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$270.29	5	\$1,351.43
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acre	\$163.26	5	\$816.30

**Practice:** 327 - Conservation Cover

**Scenario:** #2 - Native Grasses with Forbs, Field Crop Operation

**Scenario Description:** This practice applies on land to be retired from agricultural production and on other lands needing permanent protective cover. This practice typically involves conversion from a clean-tilled (conventional tilled) intensive cropping system to permanent native vegetation. The mix typically includes 70 to 90 percent native perennial grasses and 10 to 30 percent native forbs and legumes. The typical size of the practice is 20 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts. Associated Practices: Brush Management (314), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Crops such as corn, soybeans, small grains or vegetables are conventionally grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Soil erosion occurs with visible rills present, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

**After Situation:** Land covered with permanent native grass vegetation has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** \$13,112.26

**Scenario Cost/Unit:** \$655.61

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$15.93	20	\$318.52
Native Grass and Forb Mix, for Wildlife (including pollinators) or Ecosystem Restoration	2335	Native grass and forb/legume mix, including specialized species. Includes material and shipping only.	Acre	\$261.29	20	\$5,225.72

**Equipment Installation**

Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$7.22	20	\$144.43
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	\$24.18	40	\$967.11
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	20	\$502.83
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	20	\$262.35

**Foregone Income**

FI, Organic, Corn Dryland	2232	Organic Dryland Corn is Primary Crop	Acre	\$338.08	10	\$3,380.76
FI, Organic, Soybeans Dryland	2234	Organic Dryland Soybeans is Primary Crop	Acre	\$280.04	5	\$1,400.19
FI, Organic, Wheat Dryland	2236	Organic Dryland Wheat is Primary Crop	Acre	\$182.07	5	\$910.36

**Practice:** 327 - Conservation Cover

**Scenario:** #3 - Orchard or Vineyard Alleyways

**Scenario Description:** This practice applies on orchards and vineyards needing permanent protective cover in the alleyways between tree and vine rows. The typical size of this practice is 20 acres. This practice typically involves conversion from a clean-tilled (conventional tilled) intensive cropping system to permanent vegetation (scenario includes non-native grass and legume mix). This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, enhance wildlife and/or pollinator habitat, manage plant pests, and reduce air quality impacts. 60% conservation cover per acre is typical. Associated Practices: Brush Management (314), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Orchard or vineyard with bare soil between vine/tree rows. Bare soil is exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter sediment/nutrient runoff from orchards/vineyards increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of long periods of bare soil. Little to no wildlife/pollinator habitat present.

**After Situation:** Orchard or Vineyard area between vine/tree rows are planted with permanent introduced grass/legume mix. Area covered has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects, pollinators, and wildlife.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** \$2,682.66

**Scenario Cost/Unit:** \$134.13

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes)	2317	Cool season grass and legume mix. Includes material and shipping only.	Acre	\$49.65	12	\$595.76
Nitrogen (N), Ammonium Nitrate	69	Price per pound of N supplied by Ammonium Nitrate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.73	480	\$351.30
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.78	600	\$470.49
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.44	600	\$261.39

**Equipment Installation**

Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$8.09	12	\$97.07
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	\$24.18	12	\$290.13
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	12	\$301.70
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	24	\$314.81

**Practice:** 327 - Conservation Cover

**Scenario:** #4 - Pollinator Mix, Native Forbs and Legumes, Field Crop Operation

**Scenario Description:** Permanent vegetation established on any land needing permanent vegetative cover that provides high quality habitat for pollinators and other wildlife. Typically, the mix contains 70 to 90 percent native forbs and legumes, with 10 to 30 percent native grasses, and is preconfigured and commercially available from native seed suppliers. Typical practice size is variable depending on site, this scenario uses 1 ac as the typical size. In addition to providing pollinator habitat, this practice scenario may also reduce sheet and rill erosion, improve soil quality, improve water quality, and improve air quality. The practice may also provide wildlife habitat. Practice applicable on cropland, odd areas, corners, etc. Associated Practices: Brush Management (314), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Crops such as corn, soybeans, or cotton are conventionally grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Soil erosion occurs with visible rills present, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife or pollinator habitat.

**After Situation:** Land covered with permanent pollinator habitat including a native mix of predominantly forbs and legumes with a small percentage of grasses. This practice may also have reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for pollinator habitat may also provide cover for beneficial insects and wildlife. This scenario does not apply to critical area plantings.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$940.99

**Scenario Cost/Unit:** \$940.99

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$7.22	1	\$7.22
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	\$24.18	2	\$48.36
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	1	\$25.14
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	1	\$13.12

**Foregone Income**

FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$271.88	0.5	\$135.94
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$270.29	0.25	\$67.57
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acre	\$163.26	0.25	\$40.81

**Materials**

Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$15.93	1	\$15.93
Three Species Mix, Native Forb	2333	Native forb mix. Includes material and shipping only.	Acre	\$586.90	1	\$586.90

**Practice:** 327 - Conservation Cover

**Scenario:** #5 - Pollinator Specialized Mix

**Scenario Description:** Permanent native vegetation established using a specialized mix for pollinators, usually targeting specific species or groups of species. The mix consists of native forbs, legumes, and grasses that are not readily available and/or are difficult to harvest and more costly. Typical practice size is variable depending on site, this scenario uses 1 ac as the typical size. In addition to providing pollinator habitat, this practice scenario may also reduce sheet and rill erosion, improve soil quality, improve water quality, improve air quality, and provide wildlife habitat. Practice applicable on cropland, odd areas, corners, etc. Associated Practices: Brush Management (314), Nutrient Management (590), Integrated Pest Management (595), Upland Wildlife Habitat Management (645), Restoration and Management of Rare or Declining Species (643).

**Before Situation:** Crops such as corn, soybeans, or cotton are conventionally grown and harvested. The system provides little to no wildlife or pollinator habitat.

**After Situation:** Land covered with permanent pollinator habitat containing a specialized mix and targeted to specific species or groups of species. This practice may also result in reduced soil erosion, reduced water/sediment runoff, improved air quality, and habitat for wildlife and beneficial insects. This scenario does not apply to critical area plantings.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$1,402.94

**Scenario Cost/Unit:** \$1,402.94

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$7.22	2	\$14.44
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	\$24.18	2	\$48.36
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	1	\$25.14
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	1	\$13.12

**Foregone Income**

FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$271.88	0.5	\$135.94
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$270.29	0.25	\$67.57
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acre	\$163.26	0.25	\$40.81

**Materials**

Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$15.93	2	\$31.85
Specialized native grass and forb mix	2619	A mix of native grass and forbs to be used for specialized purposes such as wildlife (including pollinators) or ecosystem restoration, requiring species not readily available and/or difficult to produce and harvest. Includes material and shipping only.	Acre	\$1,025.70	1	\$1,025.70

**Practice:** 327 - Conservation Cover

**Scenario:** #6 - Vegetable or fruit to Permanent Seeding

**Scenario Description:** This practice applies on land needing permanent protective cover. This practice typically involves conversion from an intensive cropping system to permanent non-native vegetation (scenario includes non-native grass/legume mix). The typical size of the practice is 5 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts. Associated Practices: Brush Management (314), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Crops such as vegetables and small fruit crops are grown and harvested. Soil surface residue amounts average 10% or less. Soil erosion occurs with visible rills present, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

**After Situation:** Cropland is covered with permanent non-native grass/legume mix vegetation has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 5

**Total Scenario Cost:** \$6,965.22

**Scenario Cost/Unit:** \$1,393.04

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Nitrogen (N), Ammonium Nitrate	69	Price per pound of N supplied by Ammonium Nitrate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.73	250	\$182.97
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.78	250	\$196.04
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.44	100	\$43.56
Two Species Mix, Cool Season Annual (1 grass and 1 legume)	2314	Cool season annual grass and legume mix. Includes material and shipping only.	Acre	\$54.10	5	\$270.52

**Equipment Installation**

Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$8.09	5	\$40.45
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	\$24.18	10	\$241.78
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	5	\$125.71
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	15	\$196.76

**Foregone Income**

FI, Vegetables	2033	Vegetables is Primary Crop	Acre	\$1,133.49	5	\$5,667.44
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**Practice:** 327 - Conservation Cover

**Scenario:** #7 - Organic Field Crops to Permanent Seeding

**Scenario Description:** This practice applies on organically managed land needing permanent protective cover. This practice typically involves conversion from an intensive organic cropping system to permanent non-native vegetation (scenario includes non-native grass/legume mix). The typical size of the practice is 5 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts. Associated Practices: Brush Management (314), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Field crops such as corn and soybeans are organically grown and harvested. Full width tillage is utilized, weeds controlled mainly by cultivation. Soil surface residue amounts average 10% or less. Soil erosion occurs with visible rills present, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

**After Situation:** Organically managed land covered with permanent non-native grass/legume mix vegetation has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Scenario Feature Measure:** Acres Planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 5

**Total Scenario Cost:** \$2,672.41

**Scenario Cost/Unit:** \$534.48

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Certified Organic, Two Species Mix, Cool Season, Annual Grasses and Legumes	2339	Certified organic cool season annual grass and legume mix. Includes material and shipping only.	Acre	\$98.96	5	\$494.82
Nitrogen, Organic	266	ORGANIC Nitrogen	Pound	\$0.25	250	\$62.65
Phosphorus, Organic	267	ORGANIC Phosphorus	Pound	\$0.25	250	\$62.44
Potassium, Organic	268	ORGANIC Potassium	Pound	\$0.25	100	\$24.98

**Equipment Installation**

Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$8.09	5	\$40.45
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	\$24.18	10	\$241.78
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	5	\$125.71
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	15	\$196.76

**Foregone Income**

FI, Organic, Corn Dryland	2232	Organic Dryland Corn is Primary Crop	Acre	\$338.08	2.5	\$845.19
FI, Organic, Soybeans Dryland	2234	Organic Dryland Soybeans is Primary Crop	Acre	\$280.04	1.25	\$350.05
FI, Organic, Wheat Dryland	2236	Organic Dryland Wheat is Primary Crop	Acre	\$182.07	1.25	\$227.59

**Practice:** 327 - Conservation Cover

**Scenario:** #8 - Organic Vegetable or Fruit to Permanent Seeding

**Scenario Description:** This practice applies on organically managed land needing permanent protective cover. This practice typically involves conversion from an intensive organic cropping system to permanent native vegetation (scenario includes native grass/legume mix). The typical size of the practice is 5 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts. \*Certified Organic Native Seed is typically NOT available, therefore non-organic seed components were used. Associated Practices: Brush Management (314), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Crops such as vegetables and small fruit crops are organically grown and harvested. Full width tillage is utilized, weeds controlled mainly by cultivation. Soil surface residue amounts average 10% or less. Soil erosion occurs with visible rills present, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

**After Situation:** Organically manage land covered with permanent native grass/legume mix vegetation has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 5

**Total Scenario Cost:** \$7,840.86

**Scenario Cost/Unit:** \$1,568.17

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Phosphorus, Organic	267	ORGANIC Phosphorus	Pound	\$0.25	250	\$62.44
Potassium, Organic	268	ORGANIC Potassium	Pound	\$0.25	250	\$62.44
Untreated Conventional Seed, Two Species Mix, Warm Season, Perennial Grasses	2342	Untreated conventional native, warm season perennial grass. May contain seed that are not available as certified organic. Includes material and shipping only.	Acre	\$94.57	5	\$472.84

**Equipment Installation**

Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$8.09	5	\$40.45
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	\$24.18	15	\$362.67
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	5	\$125.71
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	15	\$196.76

**Foregone Income**

FI, Organic, Vegetables	2252	Vegetables is Primary Crop	Acre	\$1,303.51	5	\$6,517.55
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**Practice:** 327 - Conservation Cover

**Scenario:** #9 - Native Wetland Seeding Mix

**Scenario Description:** A seed mix of comprised native grasses, rushes, sedges, and forbs that will provide food and cover for insects, birds, and mammals utilizing restored/enhanced wetlands. The typical size is 1 acre. The practice scenario is used to reduce soil erosion, improve water quality, and develop wildlife habitat. Does not include any fertilizer or herbicides, as these are generally not required in wetland conditions.

**Before Situation:** An altered wetland is restored or enhanced to support wildlife habitat and improve water quality, but is lacking appropriate vegetative habitat to support wetland species. Adequate seed stock does not exist within the soil system.

**After Situation:** The wetland is planted with a wetland seed mix of native grasses, rushes, sedges, and forbs that provide food and cover for insects, birds, and mammals within the restored/enhanced wetlands.

**Scenario Feature Measure:** Acre of seeded area

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$1,011.77

**Scenario Cost/Unit:** \$1,011.77

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	1	\$25.14
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**Materials**

Six Species Mix, Native Forb	2334	Native forb mix. Includes material and shipping only.	Acre	\$986.62	1	\$986.62
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**Practice:** 328 - Conservation Crop Rotation

**Scenario:** #1 - Standard Rotation

**Scenario Description:** The producer implements a planned rotational cropping sequence as part of a conservation management system to reduce soil erosion, maintain or improve soil organic matter, balance nutrients, and manage plant pests. A planned rotational cropping system includes the planned crop sequence, total length of rotation, crop types grown, and the length of time each crop will be grown. The producer typically attends training to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 100 acre field. The system is planned to complement the cropping system so there should be no loss in crop income. Associated Practices: Residue and Tillage Management - No-Till/Strip Till/Direct Seed (329), Contour Farming (330), Cover Crop (340), Residue and Tillage Management - Seasonal (344), Residue and Tillage management - Mulch-Till (345), Residue and Tillage Management - Ridge Till (346), Mulching (484), Forage Harvest Management (511), Stripcropping (585), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Year-after-year production of either the same crop or a low-residue producing crop rotation has caused soil quality degradation, nutrient depletion, and low soil organic matter. The producer meets the nutrient deficit through additional soil additives.

**After Situation:** The producer implements a planned rotation sequence to manage the nutrient needs. A high residue and/or nitrogen-fixing crops crop are typically planted in the rotation. The planned rotation improves soil quality, reduces soil additives needed, builds organic matter in the soil, and helps to break pest cycles. The system is planned to complement the cropping system so there is no loss in crop income. A planned rotational cropping system includes the planned crop sequence, total length of rotation, crop types grown, and the length of time each grown will be grown. The producer typically attends training to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 100 acre conventional field.

**Scenario Feature Measure:** Acres Planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 100

**Total Scenario Cost:** \$1,735.84

**Scenario Cost/Unit:** \$17.36

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$43.40	40	\$1,735.84
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**Practice:** 328 - Conservation Crop Rotation

**Scenario:** #2 - Organic Standard Rotation

**Scenario Description:** The producer implements a planned rotational cropping sequence on an organic or transitioning to organic farm as part of a conservation management system to reduce soil erosion, maintain or improve soil organic matter, balance nutrients, and manage plant pests. A planned rotational cropping system includes the planned crop sequence, total length of rotation, crop types grown, and the length of time each crop will be grown. The producer typically attends training to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 75 acre organic field. The system is planned to complement the cropping system so there should be no loss in crop income. Associated Practices: Residue and Tillage Management - No-Till/Strip Till/Direct Seed (329), Contour Farming (330), Cover Crop (340), Residue and Tillage Management - Seasonal (344), Residue and Tillage management - Mulch-Till (345), Residue and Tillage Management - Ridge Till (346), Mulching (484), Forage Harvest Management (511), Stripcropping (585), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Year-after-year production of either the same crop or a low-residue producing crop rotation has caused soil quality degradation, nutrient depletion, and low soil organic matter. The producer meets the nutrient deficit through additional soil additives.

**After Situation:** The producer implements a planned rotation sequence on an organic or transitioning to organic farm to manage the nutrient needs. A high residue and/or nitrogen-fixing crops crop are typically planted in the rotation to provide nutrients for subsequent crops and improve soil organic matter. The planned rotation improves soil quality, reduces soil additives needed, builds organic matter in the soil, and helps to break pest cycles. The system is planned to complement the cropping system so there is no loss in crop income. A planned rotational cropping system includes the planned crop sequence, total length of rotation, crop types grown, and the length of time each grown will be grown. The producer typically attends training to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 75 acre organic field.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 75

**Total Scenario Cost:** \$1,952.82

**Scenario Cost/Unit:** \$26.04

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$43.40	45	\$1,952.82
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**Practice:** 328 - Conservation Crop Rotation

**Scenario:** #3 - Specialty Crops Rotation

**Scenario Description:** The producer implements a planned rotational cropping sequence for specialty crops (high value fruits and vegetables) as part of a conservation management system to reduce soil erosion, maintain or improve soil organic matter, balance nutrients, and manage plant pests. A planned rotational cropping system includes the planned crop sequence, total length of rotation, crop types grown, and the length of time each crop will be grown. The producer typically attends training to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 50 acre specialty crop field. The system is planned to complement the cropping system so there should be no loss in crop income. Associated Practices: Residue and Tillage Management - No-Till/Strip Till/Direct Seed (329), Contour Farming (330), Cover Crop (340), Residue and Tillage Management - Seasonal (344), Residue and Tillage management - Mulch-Till (345), Residue and Tillage Management - Ridge Till (346), Mulching (484), Forage Harvest Management (511), Stripcropping (585), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Year-after-year production of either the same crop or a low-residue producing crop rotation has caused soil quality degradation, nutrient depletion, and low soil organic matter. The producer meets the nutrient deficit through additional soil additives.

**After Situation:** The producer implements a planned rotation sequence for specialty crops to manage the nutrient needs. A high residue and/or nitrogen-fixing crops crop are typically planted in the rotation to provide nutrients for subsequent crops and improve soil organic matter. The planned rotation improves soil quality, reduces soil additives needed, builds organic matter in the soil, and helps to break pest cycles. The system is planned to complement the cropping system so there is no loss in crop income. A planned rotational cropping system includes the planned crop sequence, total length of rotation, crop types grown, and the length of time each grown will be grown. The producer typically attends training to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 50 acre field.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 50

**Total Scenario Cost:** \$2,169.80

**Scenario Cost/Unit:** \$43.40

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$43.40	50	\$2,169.80
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**Practice:** 328 - Conservation Crop Rotation

**Scenario:** #4 - Organic Specialty Crops Rotation

**Scenario Description:** The producer implements a planned rotational cropping sequence for organic specialty crops (high value fruits and vegetables) as part of a conservation management system to reduce soil erosion, maintain or improve soil organic matter, balance nutrients, and manage plant pests. A planned rotational cropping system includes the planned crop sequence, total length of rotation, crop types grown, and the length of time each crop will be grown. The producer typically attends training to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 35 acre organic specialty crop field. The system is planned to complement the cropping system so there should be no loss in crop income. Associated Practices: Residue and Tillage Management - No-Till/Strip Till/Direct Seed (329), Contour Farming (330), Cover Crop (340), Residue and Tillage Management - Seasonal (344), Residue and Tillage management - Mulch-Till (345), Residue and Tillage Management - Ridge Till (346), Mulching (484), Forage Harvest Management (511), Stripcropping (585), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Year-after-year production of either the same crop or a low-residue producing crop rotation on an organic farm has caused soil quality degradation, nutrient depletion, and low soil organic matter. The producer meets the nutrient deficit through additional soil additives.

**After Situation:** The producer implements a planned rotation sequence for organic specialty crops to manage the nutrient needs. A high residue and/or nitrogen-fixing crop are typically planted in the rotation to provide nutrients for subsequent crops and improve soil organic matter. The planned rotation improves soil quality, reduces soil additives needed, builds organic matter in the soil, and helps to break pest cycles. The system is planned to complement the cropping system so there is no loss in crop income. A planned rotational cropping system includes the planned crop sequence, total length of rotation, crop types grown, and the length of time each grown will be grown. The producer typically attends training to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 35 acre field.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 35

**Total Scenario Cost:** \$2,386.78

**Scenario Cost/Unit:** \$68.19

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$43.40	55	\$2,386.78
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**Practice:** 340 - Cover Crop

**Scenario:** #1 - Small grain or legume

**Scenario Description:** Typically a small grain planted as a cover crop either immediately after harvest of a row crop or interseeded between rows during the growth cycle, and will be followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a no-till drill or interseeder. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using an approved herbicide and/or by mechanical operations within 3 weeks prior to planting the subsequent crop. Associated practices: Conservation Cover (327), Conservation Crop Rotation (328), Residue and Tillage Management, No-Till/Strip Till/Direct Seed (329), Critical Area Planting (342), Residue Management, Seasonal (344), Residue and Tillage Management, Mulch Till (345), Residue and Tillage Management, Ridge Till (346), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Row crops such as corn or soybeans are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

**After Situation:** Within 30 days after harvest of row crop, fields are planted with a small grain cover crop, typically rye or in areas where cover crops establishment is not that feasible because of late harvest and short season fields are interseeded with a diverse mix of species early in the crop growing season. The average field size is 30 acres. The cover crop is seeded with a no-till drill or interseeder. No additional fertilizer is applied with a cover crop planted after harvest however when interseeded sidedressing the commodity crop is allowed. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** \$2,627.49

**Scenario Cost/Unit:** \$87.58

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$15.93	30	\$477.79
One Species, Cool Season, Annual Grass or Legume	2311	Cool season annual grass or legume. Includes material and shipping only.	Acre	\$39.29	30	\$1,178.82

**Equipment Installation**

Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$7.22	30	\$216.65
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	30	\$754.24

**Practice:** 340 - Cover Crop

**Scenario:** #4 - Basic Organic

**Scenario Description:** Typically a small grain or small grain-legume mix (may also use forage sorghum, radishes, turnips, buckwheat, etc) will be planted as a cover crop immediately after harvest of an organically grown crop, and will be followed by an organically grown crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a no-till drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using a mechanical kill method (mowing, rolling, undercutting, etc.), within weeks prior to planting the subsequent crop. This scenario **REQUIRES** use of Certified Organic Seed. Associated practices: Conservation Cover (327), Conservation Crop Rotation (328), Residue and Tillage Management, No-Till/Strip Till/Direct Seed (329), Critical Area Planting (342), Residue Management, Seasonal (344), Residue and Tillage Management, Mulch Till (345), Residue and Tillage Management, Ridge Till (346), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Organically grown crops such as various vegetable and fruit crops (along with organically produced row crops) are grown and harvested in mid-late fall. Fields are disked immediately following harvest. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

**After Situation:** Within 30 days after harvest of organic crop, fields are planted with a small grain-legume mix cover crop, typically rye and clover. The average field size is 25 acres. The cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. The cover crop is terminated with using a mechanical kill method (mowing, rolling, undercutting, etc.), prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, and plant diversity introduced to the cropping system. Wind erosion is reduced by standing residues. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** \$3,325.75

**Scenario Cost/Unit:** \$110.86

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	\$24.18	30	\$725.33
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	30	\$754.24

**Materials**

Certified Organic, One Species, Cool Season, Annual grass	2338	Certified organic cool season annual grass. Includes material and shipping only.	Acre	\$61.54	30	\$1,846.18
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**Practice:** 340 - Cover Crop

**Scenario:** #5 - Organic Mix

**Scenario Description:** Typically a small grain or small grain-legume mix (may also use forage sorghum, radishes, turnips, buckwheat, etc) will be planted as a cover crop immediately after harvest of an organically grown crop, and will be followed by an organically grown crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a no-till drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using a mechanical kill method (mowing, rolling, undercutting, etc.), within weeks prior to planting the subsequent crop. This scenario **REQUIRES** use of Certified Organic Seed. Associated practices: Conservation Cover (327), Conservation Crop Rotation (328), Residue and Tillage Management, No-Till/Strip Till/Direct Seed (329), Critical Area Planting (342), Residue Management, Seasonal (344), Residue and Tillage Management, Mulch Till (345), Residue and Tillage Management, Ridge Till (346), Nutrient Management (590), Integrated Pest Management (595).

**Before Situation:** Organically grown crops such as various vegetable and fruit crops (along with organically produced row crops) are grown and harvested in mid-late fall. Fields are disked immediately following harvest. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

**After Situation:** Within 30 days after harvest of organic crop, fields are planted with a small grain-legume mix cover crop, typically rye and clover. The average field size is 25 acres. The cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. The cover crop is terminated with using a mechanical kill method (mowing, rolling, undercutting, etc.), prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, and plant diversity introduced to the cropping system. Wind erosion is reduced by standing residues. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** \$4,448.50

**Scenario Cost/Unit:** \$148.28

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	\$24.18	30	\$725.33
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	30	\$754.24

**Materials**

Certified Organic, Two Species Mix, Cool Season, Annual Grasses and Legumes	2339	Certified organic cool season annual grass and legume mix. Includes material and shipping only.	Acre	\$98.96	30	\$2,968.93
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**Practice:** 340 - Cover Crop

**Scenario:** #6 - Advanced Cover Crop

**Scenario Description:** An advanced cover cropping system is planted immediately after harvest. Advanced cover crop includes aerial seeding, early planting, and multi-species mixes (3 species or more). Typically, a multi-species mix is planted using 5 species or more using a no-till drill. The cover crop is allowed to generate as much biomass as possible without delaying planting of the following crop. The cover crop will be terminated using an approved herbicide and/or by mechanical operations within 3 weeks prior to planting the subsequent crop. Associated practices: Conservation Cover (327), Conservation Crop Rotation (328), Residue and Tillage Management, No-Till/Strip Till/Direct Seed (329), Critical Area Planting (342), Residue Management, Seasonal (344), Residue and Tillage Management, Mulch Till (345), Residue and Tillage Management, Ridge Till (346), Nutrient Management (590), Integrated Pest Management (595)

**Before Situation:** Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

**After Situation:** Within 30 days after harvest of row crop, fields are planted with a multispecies cover crop with over 3 species to address multiple soil health concerns. The cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring plating as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

**Scenario Feature Measure:** Acre Planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** \$3,251.10

**Scenario Cost/Unit:** \$108.37

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Five Species Mix, Cool Season, Annual Grasses and Legumes	2320	Cool season, introduced grass and legume mix. Includes material and shipping only.	Acre	\$60.08	30	\$1,802.43
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$15.93	30	\$477.79

**Equipment Installation**

Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$7.22	30	\$216.65
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	30	\$754.24

**Practice:** 340 - Cover Crop

**Scenario:** #7 - Cover Crop Adaptive Mgt

**Scenario Description:** The practice scenario is for the implementation of cover crops in small replicated plots to allow the producer to learn how to manage cover crops on their operation. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement a particular cover crop management strategy (e.g., cover crop vs no cover crop, multiple species vs, single specie, evaluate different termination methods or timings, using a legume vs no legume for nitrogen credits). This will be done following the interim guidance for cover crop adaptive management to be issued to all field offices.

**Before Situation:** Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil. The producer is considering the use of cover crops but is unsure how to manage on their unique operation or is seeking a way to better manage cover crops in the operation.

**After Situation:** Installation of this scenario will result in establishment of a cover crop replicated plots to compare to different management strategies for cover crop management following the guidance in the Agronomy Technical Note 11 - Adaptive Management and the Interim Guidance for Cover Crop Adaptive Management to be issued to all field offices for FY15. Implementation involves establishing the replicated plots to evaluate one or more cover crop management strategies. The plot will consist of at least 4 replicated plots designed, laid out, managed and evaluated with the assistance of a consultant knowledgeable in cover crop management. Results are used to make cover crop management decisions to address erosion and water quality issues. Yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 11 - Adaptive Management. The yields for each plot will be adjusted to the appropriate moisture content. This would be repeated for 3 years.

**Scenario Feature Measure:** Area planted

**Scenario Unit:** Acre

**Scenario Typical Size:** 5

**Total Scenario Cost:** \$4,055.58

**Scenario Cost/Unit:** \$811.12

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Labor**

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	30	\$649.32
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	\$96.48	30	\$2,894.29

**Materials**

Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	\$15.93	5	\$79.63
Two Species Mix, Cool Season Annual (1 grass and 1 legume)	2314	Cool season annual grass and legume mix. Includes material and shipping only.	Acre	\$54.10	5	\$270.52

**Equipment Installation**

Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$7.22	5	\$36.11
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	5	\$125.71

**Practice:** 342 - Critical Area Planting

**Scenario:** #1 - Grass/legume mix, normal tillage

**Scenario Description:** Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with light tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application. Associated Practices: Access Control (472), Diversion (362), Obstruction Removal (500), Streambank and Shoreline Protection (580), Subsurface Drain (606), and Underground Outlet (620)

**Before Situation:** Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind erosion, sheet and rill erosion, or visible rills may have already occurred. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:** This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac), tall fescue (30 lbs/ac), and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre.

**Scenario Feature Measure:** area seeded

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$436.76

**Scenario Cost/Unit:** \$436.76

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes)	2317	Cool season grass and legume mix. Includes material and shipping only.	Acre	\$49.65	1	\$49.65
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$113.27	2	\$226.53
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.60	30	\$18.04
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.78	60	\$47.05
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.44	60	\$26.14

**Equipment Installation**

Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$9.89	1	\$9.89
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$8.09	1	\$8.09
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	1	\$25.14
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	2	\$26.23

**Practice:** 342 - Critical Area Planting

**Scenario:** #2 - Organic Grass/legume mix-normal tillage

**Scenario Description:** Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with light tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application. Certified organic seed and fertilizer based upon NOP approved fertilizer inputs will be used where available. Associated Practices: Access Control (472), Diversion (362), Obstruction Removal (500), Streambank and Shoreline Protection (580), Subsurface Drain (606), and Underground Outlet (620)

**Before Situation:** Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, etc) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind erosion, sheet and rill erosion, or visible rills may have already occurred. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:** This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. The plant nutrients will be supplied by a blend of organic soil amendments. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac) and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre. Organic seed will be used where available. Manure may be used in lieu of a commercially blended product as long as the manure is tested and the correct quantity of manure is calculated such that the specified 30-60-60 N-P2O5-K2O requirement is met.

**Scenario Feature Measure:** area seeded

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$403.00

**Scenario Cost/Unit:** \$403.00

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Certified Organic, Three Species Mix, Cool Season, Perennial Grasses and Legumes	2340	Certified organic cool season perennial grass and legume mix. Includes material and shipping only.	Acre	\$69.62	1	\$69.62
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$113.27	2	\$226.53
Nitrogen, Organic	266	ORGANIC Nitrogen	Pound	\$0.25	30	\$7.52
Phosphorus, Organic	267	ORGANIC Phosphorus	Pound	\$0.25	60	\$14.99
Potassium, Organic	268	ORGANIC Potassium	Pound	\$0.25	60	\$14.99

**Equipment Installation**

Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$9.89	1	\$9.89
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$8.09	1	\$8.09
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	1	\$25.14
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	2	\$26.23

**Practice:** 342 - Critical Area Planting

**Scenario:** #3 - Native seeding - normal tillage

**Scenario Description:** Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with light tillage implements, native grass seed, and fertilizer and lime with application. Associated Practices: Access Control (472), Diversion (362), Obstruction Removal (500), Streambank and Shoreline Protection (580), Subsurface Drain (606), and Underground Outlet (620)

**Before Situation:** Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, etc) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind erosion, sheet and rill erosion, or visible rills may have already occurred. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:** This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 60 lbs of phosphate and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Big Bluestem (14 lbs/ac) and Switchgrass (2 lbs/ac) with a nurse crop of oats at a seeding rate of 32 lbs per acre.

**Scenario Feature Measure:** area seeded

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$590.05

**Scenario Cost/Unit:** \$590.05

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$113.27	2	\$226.53
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.78	60	\$47.05
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.44	60	\$26.14
Three plus Species Mix, Warm Season, Native Perennial	2327	Native, warm season perennial grass. Includes material and shipping only.	Acre	\$220.98	1	\$220.98

**Equipment Installation**

Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$9.89	1	\$9.89
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$8.09	1	\$8.09
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	1	\$25.14
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	2	\$26.23

**Practice:** 342 - Critical Area Planting

**Scenario:** #4 - Grass/legume mix-moderate grading

**Scenario Description:** Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of small gullies, seedbed preparation with light tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application. Associated Practices: Access Control (472), Diversion (362), Obstruction Removal (500), Streambank and Shoreline Protection (580), Subsurface Drain (606), and Underground Outlet (620)

**Before Situation:** Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc) or human disturbance. The exposed areas have visible rills and small gullies averaging 1 foot in depth and 1 foot in width. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:** This typical 1.0 acre critical area is stabilized by grading and shaping the small gullies with a dozer (4 hours) and then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac), tall fescue (30 lbs/ac), and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre.

**Scenario Feature Measure:** area seeded

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$1,065.41

**Scenario Cost/Unit:** \$1,065.41

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes)	2317	Cool season grass and legume mix. Includes material and shipping only.	Acre	\$49.65	1	\$49.65
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$113.27	1	\$113.27
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.60	30	\$18.04
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.78	60	\$47.05
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.44	60	\$26.14

**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	\$32.34	4	\$129.37
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**Equipment Installation**

Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$9.89	1	\$9.89
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	4	\$311.40
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$8.09	1	\$8.09
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	1	\$25.14
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	2	\$26.23

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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**Practice:** 342 - Critical Area Planting

**Scenario:** #5 - Native seeding-moderate grading

**Scenario Description:** Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of small gullies, seedbed preparation with light tillage implements, native grass seed, companion crop, and fertilizer and lime with application. Associated Practices: Access Control (472), Diversion (362), Obstruction Removal (500), Streambank and Shoreline Protection (580), Subsurface Drain (606), and Underground Outlet (620)

**Before Situation:** Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc) or human disturbance. The exposed areas have visible rills and small gullies averaging 1 foot in depth and 1 foot in width. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:** This typical 1.0 acre critical area is stabilized by grading and shaping the small gullies with a dozer (4 hours) and then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 60 lbs of phosphate and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Big Bluestem (14 lbs/ac) and Switchgrass (2 lbs/ac) with a nurse crop of oats at a seeding rate of 32 lbs per acre.

**Scenario Feature Measure:** area seeded

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$1,331.98

**Scenario Cost/Unit:** \$1,331.98

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$113.27	2	\$226.53
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.78	60	\$47.05
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.44	60	\$26.14
Three plus Species Mix, Warm Season, Native Perennial	2327	Native, warm season perennial grass. Includes material and shipping only.	Acre	\$220.98	1	\$220.98

**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	\$32.34	4	\$129.37
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**Equipment Installation**

Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$9.89	1	\$9.89
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	4	\$311.40
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$8.09	1	\$8.09
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	1	\$25.14
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	2	\$26.23

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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**Practice:** 342 - Critical Area Planting

**Scenario:** #6 - Grass/legume mix-heavy grading

**Scenario Description:** Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of moderate to severe gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application. Associated Practices: Access Control (472), Diversion (362), Obstruction Removal (500), Streambank and Shoreline Protection (580), Subsurface Drain (606), and Underground Outlet (620)

**Before Situation:** Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc) or human disturbance. The exposed areas have visible rills and moderate to severe gullies averaging 3 feet in depth and 3 feet in width. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:** This typical 1.0 acre critical area is stabilized by grading and shaping the moderate to severe gullies with a dozer (8 hours) and then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac) and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre.

**Scenario Feature Measure:** area seeded

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$1,619.45

**Scenario Cost/Unit:** \$1,619.45

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes)	2317	Cool season grass and legume mix. Includes material and shipping only.	Acre	\$49.65	1	\$49.65
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$113.27	2	\$226.53
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.60	30	\$18.04
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.78	60	\$47.05
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.44	60	\$26.14

**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	\$32.34	8	\$258.74
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**Equipment Installation**

Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$9.89	1	\$9.89
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	8	\$622.80
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$8.09	1	\$8.09
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	1	\$25.14
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	2	\$26.23

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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**Practice:** 342 - Critical Area Planting

**Scenario:** #7 - Native seeding-heavy grading

**Scenario Description:** Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of moderate to severe gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application. Associated Practices: Access Control (472), Diversion (362), Obstruction Removal (500), Streambank and Shoreline Protection (580), Subsurface Drain (606), and Underground Outlet (620)

**Before Situation:** Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc) or human disturbance. The exposed areas have visible rills and moderate to severe gullies averaging 3 feet in depth and 3 feet in width. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:** This typical 1.0 acre critical area is stabilized by grading and shaping the moderate to severe gullies with a dozer (8 hours) and then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 60 lbs of phosphate and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Big Bluestem (14 lbs/ac) and Switchgrass (2 lbs/ac) with a nurse crop of oats at a seeding rate of 32 lbs per acre.

**Scenario Feature Measure:** area seeded

**Scenario Unit:** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$1,772.74

**Scenario Cost/Unit:** \$1,772.74

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Materials**

Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$113.27	2	\$226.53
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.78	60	\$47.05
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.44	60	\$26.14
Three plus Species Mix, Warm Season, Native Perennial	2327	Native, warm season perennial grass. Includes material and shipping only.	Acre	\$220.98	1	\$220.98

**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	\$32.34	8	\$258.74
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**Equipment Installation**

Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$9.89	1	\$9.89
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	8	\$622.80
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$8.09	1	\$8.09
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	1	\$25.14
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	2	\$26.23

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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**Practice:** 356 - Dike

**Scenario:** #1 - Material haul < 1 mile

**Scenario Description:** Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Material haul < 1 mile. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS464 Irrigation Land Levelling, PS500 Obstruction Removal, PS528 Prescribed Grazing, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.

**Before Situation:** Site is subject to flooding or inundation which poses a potential hazard to public safety, damage to land or property. Site may also require control of water level for purposes connected with crop production; fish and wildlife management; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul < 1 mile.

**After Situation:** Water level controlled by a stable earthen structure. Potential hazard to public safety, land or property mitigated; environmental benefit provided.

**Scenario Feature Measure:** Volume of Earthfill (including volume of soil berm, as needed)

**Scenario Unit:** Cubic Yard

**Scenario Typical Size:** 4500

**Total Scenario Cost:** \$36,139.71

**Scenario Cost/Unit:** \$8.03

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	4500	\$21,930.48
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	4500	\$11,604.24

**Labor**

Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$96.48	6	\$578.86
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**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	\$574.99	3	\$1,724.98
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16

**Practice:** 356 - Dike

**Scenario:** #2 - Material haul > 1 mile

**Scenario Description:** Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Material haul > 1 mile. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS464 Irrigation Land Levelling, PS500 Obstruction Removal, PS528 Prescribed Grazing, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.

**Before Situation:** Site is subject to flooding or inundation which poses a potential hazard to public safety, damage to land or property. Site may also require control of water level for purposes connected with crop production; fish and wildlife management; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul > 1 mile.

**After Situation:** Water level controlled by a stable earthen structure. Potential hazard to public safety, land or property mitigated; environmental benefit provided.

**Scenario Feature Measure:** Volume of Earthfill (including volume of soil berm, as needed)

**Scenario Unit:** Cubic Yard

**Scenario Typical Size:** 4500

**Total Scenario Cost:** \$39,668.07

**Scenario Cost/Unit:** \$8.82

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	4500	\$21,930.48
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	4500	\$11,604.24
Hauling, bulk, highway truck	1615	Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck.	Cubic Yard Mile	\$0.39	9000	\$3,528.36

**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	\$96.48	6	\$578.86
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**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	\$574.99	3	\$1,724.98
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16

**Practice:** 356 - Dike

**Scenario:** #46 - Shallow embankment, material excavated onsite and hauled

**Scenario Description:** Typical embankment built in crop field to inhibit surface drainage and support shallow water areas and wetlands for wildlife. Material excavated onsite but not adjacent to embankment. Based on average height of 2 feet typically NTE 4 feet in height from existing ground, 4:1 side slopes, and 8-foot top width. Associated practices: Shallow Water Area Development and Management (646), Wetland Restoration (657), Wetland Creation (658), Wetland Enhancement (659), Wetland Wildlife Habitat Management (644), Structure for Water Control (587), Critical Area Planting (342).

**Before Situation:** Crop field with soils capable of supporting perched water table and surface ponding, slopes of 1 to 3 percent, typically with surface drainage to prevent ponding during growing season.

**After Situation:** Linear embankment constructed, often adjacent to drainage ditch, prevents surface flow to ditch, and results in surface ponding during wet season, including early portion of growing season. Water control structure and emergency spillway installed to manage water levels and protect embankment structural integrity.

**Scenario Feature Measure:** Linear foot of embankment

**Scenario Unit:** Linear Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** \$19,010.81

**Scenario Cost/Unit:** \$19.01

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	1770	\$8,625.99
Excavation, common earth, large equipment, 1500 ft	1221	Bulk excavation of common earth including sand and gravel with scrapers with average haul distance of 1500 feet. Includes equipment and labor.	Cubic Yard	\$4.67	1770	\$8,263.85
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$1.05	427	\$446.40

**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	\$37.24	6	\$223.43
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**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	\$574.99	2	\$1,149.98
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16

**Practice:** 362 - Diversion

**Scenario:** #1 - Diversion, large, greater than 300 feet

**Scenario Description:** An earthen channel constructed across long slopes with supporting ridge on lower side, to divert runoff away from farmsteads, agricultural waste systems, gullies, critical erosion areas, construction areas or other sensitive areas. Outlet may be waterway, underground outlet, or other suitable outlet. Typical diversion is, 1000 feet long installed on a field slope of 5 percent and requires 1 CY excavation per LF. Channel may be level or gradient and ridge may be vegetated or farmed. The quantity of excavation and fill is balanced. Associated practices: Critical Area Planting (342), Grassed Waterway (412), Lined Waterway (468), Mulching (484), Structure for Water Control (587), Subsurface Drainage (606), and Underground Outlet (620).

**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:** Diversion is installed. Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste.

**Scenario Feature Measure:** Length of Diversion

**Scenario Unit:** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** \$5,750.46

**Scenario Cost/Unit:** \$5.75

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Labor**

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	4	\$86.58
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	4	\$173.58

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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**Equipment Installation**

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	\$4.44	1000	\$4,443.12
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$1.05	550	\$574.99

**Foregone Income**

FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$271.88	0.35	\$95.16
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$270.29	0.175	\$47.30
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acre	\$163.26	0.175	\$28.57

**Practice:** 362 - Diversion

**Scenario:** #2 - Diversion, small, less than or equal to 300 feet

**Scenario Description:** An earthen channel constructed across long slopes with supporting ridge on lower side, to divert runoff away from farmsteads, agricultural waste systems, gullies, critical erosion areas, construction areas or other sensitive areas. Outlet may be waterway, underground outlet, or other suitable outlet. Typical diversion is, 200 feet long installed on a field slope of 5 percent and requires 1 CY excavation per LF. Channel may be level or gradient and ridge may be vegetated or farmed. The quantity of excavation and fill is balanced. Associated practices: Critical Area Planting (342), Grassed Waterway (412), Lined Waterway (468), Mulching (484), Structure for Water Control (587), Subsurface Drainage (606), and Underground Outlet (620).

**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:** Diversion is installed. Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste.

**Scenario Feature Measure:** Length of Diversion

**Scenario Unit:** Foot

**Scenario Typical Size:** 200

**Total Scenario Cost:** \$1,469.07

**Scenario Cost/Unit:** \$7.35

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Labor**

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	2	\$43.29
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	2	\$86.79

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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**Equipment Installation**

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	\$4.44	200	\$888.62
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$1.05	110	\$115.00

**Foregone Income**

FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$271.88	0.07	\$19.03
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$270.29	0.035	\$9.46
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acre	\$163.26	0.035	\$5.71

**Practice:** 362 - Diversion

**Scenario:** #3 - Diversion, Rebuild

**Scenario Description:** An existing earthen channel beyond its service life requires reconstruction to re-establish capacity and grade to be constructed across long slopes with supporting ridge on lower side, to divert runoff away from farmsteads, agricultural waste systems, gullies, critical erosion areas, construction areas or other sensitive areas. Typical diversion is, 1000 feet long installed on a field slope of 5 percent and requires .75 CY excavation per LF. Channel may be level or gradient and ridge may be vegetated or farmed. The quantity of excavation and fill is balanced. Associated practices: Critical Area Planting (342), Grassed Waterway (412), Lined Waterway (468), Mulching (484), Structure for Water Control (587), Subsurface Drainage (606), and Underground Outlet (620).

**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:** A rebuilt diversion has been installed. Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste.

**Scenario Feature Measure:** Linear feet of rebuilt diversion

**Scenario Unit:** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** \$4,155.02

**Scenario Cost/Unit:** \$4.16

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Labor**

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	4	\$86.58
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	4	\$173.58

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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**Equipment Installation**

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	\$4.44	750	\$3,332.34
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$1.05	250	\$261.36

**Practice:** 554 - Drainage Water Management

**Scenario:** #1 - Drainage Water Management (DWM)

**Scenario Description:** This scenario is the process of managing water discharges from surface and/or subsurface agricultural drainage systems by reducing nutrient loading into surface waters. Typical systems consist of a 40 acre field with existing drainage tile lines and installed water control structures. The operator goes to the field in order to adjust water control structures (riser boards). While on site the date and adjustment information is recorded/logged. The number of yearly adjustments is based on 6 trips to a field 5 miles from headquarters. The field time to make and record each adjustment is 0.5 hours per structure (including travel time). The typical field will contain 3 water control structures; 1 structure control field water levels and 2 structures control a single denitrifying bioreactor. Resource Concern: Water Quality - Excess Nutrients in surface and ground waters. Associated Practices: 606-Subsurface Drain; 607-Surface Drain, Field Ditch; 608-Surface Drain, Main or Lateral; 587-Structure for Water Control; 590-Nutrient Management .

**Before Situation:** Existing drainage systems are in place and water flows uncontrolled.

**After Situation:** Existing drainage systems are managed to reduce flow of field drainage waters from the site and reduce nitrate loading by denitrification.

**Scenario Feature Measure:** Number of Control Structures

**Scenario Unit:** Each

**Scenario Typical Size:** 3

**Total Scenario Cost:** \$350.26

**Scenario Cost/Unit:** \$116.75

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**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	\$37.24	9	\$335.14
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**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	\$45.80	0.33	\$15.11
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