Practice: 500 - Obstruction Removal

Scenario: #1 - Removal and Disposal of Concrete Slab

Scenario Description:

Remove and disposal of concrete slabs by saw cutting, demolition, excavation or other means required for removal. Dispose of concrete slabs so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all concrete slabs by removal to an approved location, or reuse location. Typical disposal is burial on site. Remove and dispose all concrete slabs in order to apply conservation practices or facilitate the planned land use. Concrete slab removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

After Situation:

The typical area will be a 1000 square feet of impaired land. The removal of concrete slabs will be performed by demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all concrete slabs from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

Scenario Feature Measure: Land Area

Scenario Unit: Square Feet

Scenario Typical Size: 1,000

Scenario Cost: $776.55 **Scenario Cost/Unit:** $0.78

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hour	$86.28	2	$172.56
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hour	$118.14	2	$236.28
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	4	$118.56
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 500 - Obstruction Removal

Scenario: #2 - Removal and Disposal of Fence, Feedlot

Scenario Description:

Remove and disposal of all existing fences around a livestock feeding/waste facility by demolition, excavation or other means required for removal. Dispose of all fence materials from the site so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all materials by removal to an approved landfill, wood chipping and land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Fence removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On headquarters or any land where existing feedlot fence interferes with planned land use development, public safety, or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

After Situation:

The typical feedlot fence will be 800 in linear feet. The removal of the fence will be performed with the use of equipment and hand labor. Dispose of all debris from the fence removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape such as Upland Wildlife Habitat Management (645).

Scenario Feature Measure: Length of Fence

Scenario Unit: Linear Foot

Scenario Typical Size: 800

Scenario Cost: $2,330.43 **Scenario Cost/Unit:** $2.91

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$42.05	24	$1,009.20
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	24	$499.44
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	24	$572.64
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 511 - Forage Harvest Management

Scenario: #1 - Improved Forage Quality

Scenario Description:

Improved cultural practices and recordkeeping result in better forage quality and better livestock performance.

Before Situation:

Forage cutting heights are as close to the ground as equipment will allow resulting in very low stubble height. Plant regrowth is very slow. Forage quality tests are not regularly done. Records of forage quality components, cutting heights, moisture content, and harvest schedule are not regularly kept.

After Situation:

Forage cutting heights are raised to leave at least 3-4" stubble height for cool season grasses and 6" - 8" (use a boot on the mower) for warm season grasses. Increased residual forage results in much faster plant regrowth. Forage quality tests are submitted to an accredited lab for analysis. Records of forage quality components, cutting heights, moisture content, and harvest schedule are regularly kept to track increased forage quality and improved livestock performance.

Scenario Feature Measure: Improved Relative Feed Value

Scenario Unit: Acre

Scenario Typical Size: 30

Scenario Cost: $127.65 **Scenario Cost/Unit:** $4.26

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Acquisition of Technical Knowledge						
Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$44.18	1	$44.18
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	1	$31.19
Materials						
Test, Plant Tissue Test	301	Tissue analysis for crops. Includes materials and shipping only.	Each	$26.14	2	$52.28

Practice: 511 - Forage Harvest Management

Scenario: #2 - Preemptive Harvest

Scenario Description:

Preemptive harvest of forage crops to prevent damage from insects (such as leafhopper on alfalfa) or other pests results in better forage quality and better livestock performance.

Before Situation:

Forage pests are usually controlled with pesticides.

After Situation:

Forage pests are controlled by executing a preemptive harvest before pests can damage forage quality. Forage yields are reduced because of immature stage of forage growth. Forage tests are submitted to an accredited lab for analysis. Records of forage quality components are used to adjust feeding rations.

Scenario Feature Measure: Relative Feed Value Maintained

Scenario Unit: Acre

Scenario Typical Size: 30

Scenario Cost: $127.65 **Scenario Cost/Unit:** $4.26

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Acquisition of Technical Knowledge						
Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$44.18	1	$44.18
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	1	$31.19
Materials						
Test, Plant Tissue Test	301	Tissue analysis for crops. Includes materials and shipping only.	Each	$26.14	2	$52.28

Practice: 512 - Forage and Biomass Planting

Scenario: #1 - Interseeding Legumes and/or forbs

Scenario Description:

Interseed legumes and/or forbs into an existing grass stand for the purpose of increasing plant diversity, soil quality and fertility, and plant health and enhancing the quality of forage. Scenario is appropriate for conventional production. Payment includes seed, seeding and fertility for interseeding establishment.

Before Situation:

Existing grass stand that needs additional species diversity.

After Situation:

A more diverse grass stand provides improved forage quality and availability, and improved soil condition. Payment scenario is based on red and ladino clover interseeded into a 20 acre cool season grass stand. Inputs are based on medium to low existing fertility.

Scenario Feature Measure: Acres of Forage and Biomass Planting

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: $4,282.20 **Scenario Cost/Unit:** $214.11

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.28	20	$125.60
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.69	20	$393.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.36	20	$187.20
Materials						
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	40	$1,045.60
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	2000	$1,000.00
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	20	$1,082.00
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.64	700	$448.00

Practice: 512 - Forage and Biomass Planting

Scenario: #2 - Interseed Legumes and/or forbs Organic

Scenario Description:

Interseed legumes and/or forbs into an existing grass stand for the purpose of increasing plant diversity, soil quality and fertility, and plant health and enhancing the quality of forage. Scenario is appropriate for organic production. Payment includes seed, seeding and fertility for interseeding establishment.

Before Situation:

Existing grass stand that needs additional species diversity.

After Situation:

A more diverse grass stand provides improved forage quality and availability, and improved soil condition. Payment scenario is based on red and ladino clover interseeded into a 20 acre cool season grass stand. Inputs are based on medium to low existing fertility.

Scenario Feature Measure: Acres of Forage and Biomass Planting

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: $3,954.60 **Scenario Cost/Unit:** $197.73

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.28	20	$125.60
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.36	20	$187.20
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.69	20	$393.80
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	20	$1,392.40
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	40	$1,045.60
Phosphorus, Organic	267	ORGANIC Phosphorus	Pound	$0.30	700	$210.00
Potassium, Organic	268	ORGANIC Potassium	Pound	$0.30	2000	$600.00

Practice: 512 - Forage and Biomass Planting

Scenario: #3 - Introduced Grass Establishment or Renovation

Scenario Description:

Establishing a new stand or renovating a poor stand to introduced grass, or grass with legumes and/or forbs to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Scenario is appropriate for conventional production. Payment includes site preparation, seed, seeding fertilizer, lime, and foregone income for loss of production during establishment/renovation

Before Situation:

Existing grass stand does not meet the forage demands, particularly during during periods of low forage production. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion, and soil quality.

After Situation:

Establish introduced grass and legume mix stand to improve livestock nutrition through improved forage quality and availability, and improved soil condition. Payment scenario is based on converting an existing poor condition sod to introduced grass/legume/forb mix using mechanical or chemical activities.

Scenario Feature Measure: Acres of Forage and Biomass Planting

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: $5,434.20 **Scenario Cost/Unit:** $271.71

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.36	20	$187.20
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.28	20	$125.60
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.69	20	$393.80
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$5.66	20	$113.20
Foregone Income						
FI, Hay, General Grass	2122	General Grass Hay is Primary Land Use	Ton	$41.38	20	$827.60
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	$15.63	20	$312.60
Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes)	2319	Cool season, introduced grass and legume mix. Includes material and shipping only.	Acre	$21.41	20	$428.20
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	40	$1,045.60
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	$0.62	1000	$620.00
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	1660	$830.00
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.64	860	$550.40

Practice: 512 - Forage and Biomass Planting

Scenario: #4 - Introduced Grass Establishment or Renovation Organic

Scenario Description:

Establishing a new stand or renovating a poor stand to introduced grass, or grass with legumes and/or forbs to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Scenario is appropriate for organic production. Payment includes site preparation, seed, seeding fertilizer, lime, and foregone income for loss of production during establishment/renovation

Before Situation:

Existing grass stand does not meet the forage demands, particularly during during periods of low forage production. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion, and soil quality.

After Situation:

Establish introduced grass and legume mix stand to improve livestock nutrition through improved forage quality and availability, and improved soil condition. Payment scenario is based on converting an existing poor condition sod to introduced grass/legume/forb mix using mechanical or chemical activities.

Scenario Feature Measure: Acres of Forage and Biomass Planting

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: $5,491.60 **Scenario Cost/Unit:** $274.58

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.27	40	$410.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.36	20	$187.20
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.69	20	$393.80
Foregone Income						
FI, Hay, General Grass, Organic	2200	Organic general Grass Hay is Primary Land Use	Ton	$47.59	20	$951.80
Materials						
Phosphorus, Organic	267	ORGANIC Phosphorus	Pound	$0.30	700	$210.00
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	20	$1,392.40
Nitrogen, Organic	266	ORGANIC Nitrogen	Pound	$0.30	1000	$300.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	40	$1,045.60
Potassium, Organic	268	ORGANIC Potassium	Pound	$0.30	2000	$600.00

Practice: 512 - Forage and Biomass Planting

Scenario: #5 - Native Grass Establishment or Renovation - no fertility

Scenario Description:

Establishing a new stand or renovating a poor stand to native grass, or grass with legumes and/orforbs to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Scenario is appropriate for conventional production on sites where fertility for establishment is adequate or it is determined that lime is all that is needed to enhance available nutrients. Payment includes site preparation, seed, seeding, lime, and foregone income for loss of production during establishment/renovation

Before Situation:

Existing grass stand does not meet the forage demands, particularly during during periods of low forage production. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion, and soil quality.

After Situation:

Establish native grass and legume and/or forbs mix stand to improve livestock nutrition through improved forage quality and availability, and improved soil condition. Payment scenario is based on converting an existing poor condition sod to native grass/legume/forb mix using mechanical or chemical activities.

Scenario Feature Measure: Acres of Forage and Biomass Planting

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: $8,127.20 **Scenario Cost/Unit:** $406.36

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.36	20	$187.20
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.69	20	$393.80
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$5.66	20	$113.20
Foregone Income						
FI, Hay, General Grass	2122	General Grass Hay is Primary Land Use	Ton	$41.38	40	$1,655.20
Materials						
Three plus Species Mix, Warm Season, Native Perennial	2327	Native, warm season perennial grass. Includes material and shipping only.	Acre	$220.98	20	$4,419.60
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	$15.63	20	$312.60
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	40	$1,045.60

Practice: 512 - Forage and Biomass Planting

Scenario: #6 - Native Grass Establishment or Renovation - no fertility Organic

Scenario Description:

Establishing a new stand or renovating a poor stand to native grass, or grass with legumes and/orforbs to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Scenario is appropriate for organic production on sites where fertility for establishment is adequate or it is determined that lime is all that is needed to enhance available nutrients. Payment includes site preparation, seed, seeding, lime and foregone income for loss of production during establishment/renovation

Before Situation:

Existing grass stand does not meet the forage demands, particularly during during periods of low forage production. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion, and soil quality.

After Situation:

Establish native grass and legume and/or forbs mix stand to improve livestock nutrition through improved forage quality and availability, and improved soil condition. Payment scenario is based on converting an existing poor condition sod to native grass/legume/forb mix using mechanical or chemical activities.

Scenario Feature Measure: Acres of Forage and Biomass Planting

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: $8,360.60 **Scenario Cost/Unit:** $418.03

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.27	40	$410.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.36	20	$187.20
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.69	20	$393.80
Foregone Income						
FI, Hay, General Grass, Organic	2200	Organic general Grass Hay is Primary Land Use	Ton	$47.59	40	$1,903.60
Materials						
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	40	$1,045.60
Three plus Species Mix, Warm Season, Native Perennial	2327	Native, warm season perennial grass. Includes material and shipping only.	Acre	$220.98	20	$4,419.60

Practice: 512 - Forage and Biomass Planting

Scenario: #7 - Native Grass Establishment or Renovation - with fertility

Scenario Description:

Establishing a new stand or renovating a poor stand to native grass, or grass with legumes and/orforbs to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Scenario is appropriate for conventional production on sites where fertilzer is needed for establishment. Payment includes site preparation, seed, seeding, fertilizer, lime and foregone income for loss of production during establishment/renovation

Before Situation:

Existing grass stand does not meet the forage demands, particularly during during periods of low forage production. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion, and soil quality.

After Situation:

Establish native grass and legume and/or forbs mix stand to improve livestock nutrition through improved forage quality and availability, and improved soil condition. Payment scenario is based on converting an existing poor condition sod to native grass/legume/forb mix using mechanical or chemical activities.

Scenario Feature Measure: Acres of Forage and Biomass Planting

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: $9,507.60 **Scenario Cost/Unit:** $475.38

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$5.66	20	$113.20
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.69	20	$393.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.36	20	$187.20
Foregone Income						
FI, Hay, General Grass	2122	General Grass Hay is Primary Land Use	Ton	$41.38	40	$1,655.20
Materials						
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	40	$1,045.60
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	$15.63	20	$312.60
Three plus Species Mix, Warm Season, Native Perennial	2327	Native, warm season perennial grass. Includes material and shipping only.	Acre	$220.98	20	$4,419.60
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	1660	$830.00
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.64	860	$550.40

Practice: 512 - Forage and Biomass Planting

Scenario: #8 - Native Grass Establishment or Renovation - with fertility Organic

Scenario Description:

Establishing a new stand or renovating a poor stand to native grass, or grass with legumes and/orforbs to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Scenario is appropriate for organic production on sites where fertilzer is needed for establishment. Payment includes site preparation, seed, seeding, fertilizer, lime and foregone income for loss of production during establishment/renovation

Before Situation:

Existing grass stand does not meet the forage demands, particularly during during periods of low forage production. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion, and soil quality.

After Situation:

Establish native grass and legume and/or forbs mix stand to improve livestock nutrition through improved forage quality and availability, and improved soil condition. Payment scenario is based on converting an existing poor condition sod to native grass/legume/forb mix using mechanical or chemical activities.

Scenario Feature Measure: Acres of Forage and Biomass Planting

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: $9,463.78 **Scenario Cost/Unit:** $473.19

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
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	$19.69	20	$393.80
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.27	40	$410.80
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.28	20	$125.60
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.36	20	$187.20
Foregone Income						
FI, Hay, General Grass, Organic	2200	Organic general Grass Hay is Primary Land Use	Ton	$47.59	40	$1,903.60
Materials						
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	40	$1,045.60
Phosphorus, Organic	267	ORGANIC Phosphorus	Pound	$0.30	700	$210.00
Potassium, Organic	268	ORGANIC Potassium	Pound	$0.30	2000	$600.00
Three plus Species Mix, Warm Season, Native Perennial	2327	Native, warm season perennial grass. Includes material and shipping only.	Acre	$220.98	20	$4,419.60
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	$167.58	1	$167.58

Practice: 512 - Forage and Biomass Planting

Scenario: #9 - Pasture Renovation Utilizing Interim Seeding

Scenario Description:

Rennovation of an existing pasture where an interim stand is established for one year prior to the perennial stand being established. Scenario is appropriate for rennovating an existing stand of endophyte infected fescue using the spray - smother - spray technique (spray existing grass before heading in early spring, plant a smother crop, spray smother crop in the fall, plant new grass stand into the stubble). Scenario is also appropriate for situations where any interim species is established and then the perennial is seeded after. Payment includes chemical operations, interim crop establishment and termination, and seeding of new renovated grass stand, including fertilizer and lime needed for a succesful establishment.

Before Situation:

Existing grass stand is primarily endophyte infected fescue or unwanted vegetative cover in decreased animal health and productivity.

After Situation:

Stand is renovated without the loss of production. Annual grass planted as a smother crop would be grazed, extending the grazing season. Stand is renovated to a non-endophyte introduced grass/legume stand using the spray-smother-spray technique.

Scenario Feature Measure: Acres of Forage and Biomass Planting

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: $7,335.80 **Scenario Cost/Unit:** $366.79

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$5.66	40	$226.40
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.28	20	$125.60
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.69	40	$787.60
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.36	20	$187.20
Foregone Income						
FI, Hay, General Grass	2122	General Grass Hay is Primary Land Use	Ton	$41.38	20	$827.60
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	1000	$620.00
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	20	$1,082.00
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	$15.63	40	$625.20
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	40	$1,045.60
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	1660	$830.00
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.64	860	$550.40
Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes)	2319	Cool season, introduced grass and legume mix. Includes material and shipping only.	Acre	$21.41	20	$428.20

Practice: 516 - Livestock Pipeline

Scenario: #1 - Above Ground Pipeline

Scenario Description:

An above ground plastic pipeline is installed to convey water from a source of supply to points of use for livestock in a prescribed grazing system or wildlife for temporary watering locations.

Before Situation:

Livestock have an inadequate or unacceptable water supply which can lead to compromised animal health. Water can be supplied from a central source(s) by piping to one or more locations in the pasture. Water locations are temporary and occur during non-freezing times of the year.

After Situation:

An above ground plastic pipeline is installed to convey water from a water source to point of use for temporary watering. Payment incorporates pipe and quick connect coupler and fittings. The pipeline is installed as a facilitating practice for supplying water in a managed grazing system, to reduce soil erosion, improve water quality, improve health and vigor of key forage plant species and improve or maintain animal health. The pipeline is to be protected from UV radiation damage, as well as damage from vehicles, animals, people, and fire. The landowner is responsible for repair or replacement of the pipeline as necessary under O&M during the specified life span of the practice. Cost data is applicable to organic and conventional agricultural production systems. Associated practices include Fencing (382), Prescribed Grazing (528), Trails and Walkways (575), Access Control (472), Pumping Plant (533), Water Well (642), Heavy Use Area (561) and Watering Facility (614).

Scenario Feature Measure: Foot

Scenario Unit: Linear Foot

Scenario Typical Size: 2,000

Scenario Cost: $2,331.42 **Scenario Cost/Unit:** $1.17

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	10	$208.10
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.34	878	$2,054.52
Mobilization						
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	$68.80	1	$68.80

Practice: 516 - Livestock Pipeline

Scenario: #2 - Buried Pipeline, < 2in Plastic

Scenario Description:

Installation of a plastic pipeline, less than 2" diameter, to convey water from a source of supply to points of use for livestock in a prescribed grazing system or for wildlife. Installation is by trenching, or by backhoe across a stream or other locations where installation of the pipeline by trenching is not feasible.

Before Situation:

Livestock have an inadequate or unacceptable water supply which can lead to compromised animal health. Water can be supplied from a central source(s) by piping to one or more locations in the pasture. Soil conditions are suitable for pipe installation without bedding.

After Situation:

A 1½ inch diameter, Schedule 40 PVC plastic pipeline for stockwatering, 4165 ft long is installed for supplying water in a managed grazing system, to reduce soil erosion, improve water quality, improve health and vigor of key forage plant species and improve or maintain animal health. Payment includes couplers and fittings. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices include Fencing (382), Prescribed Grazing (528), Trails and Walkways (575), Access Control (472), Pumping Plant (533), Water Well (642), Heavy Use Area (561) and Watering Facility (614).

Scenario Feature Measure: Foot

Scenario Unit: Linear Foot

Scenario Typical Size: 4,165

Scenario Cost: $10,234.47 **Scenario Cost/Unit:** $2.46

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	12	$654.84
Trencher, 8"	936	Equipment and power unit costs. Labor not included.	Hour	$87.59	34	$2,978.06
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	9	$266.76
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	34	$811.24
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	42	$874.02
Materials						
Pipe, PVC, 1 ½", SCH 40	975	Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785	Foot	$1.04	4165	$4,331.60
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	$68.80	1	$68.80

Practice: 516 - Livestock Pipeline

Scenario: #3 - Buried Pipeline, 2in - 3in Plastic

Scenario Description:

Installation of a 2" - 3" diameter plastic pipeline to convey water from a source of supply to points of use for livestock in a prescribed grazing system or for wildlife. Installation is by trenching, or by backhoe across a stream or other locations where installation of the pipeline by trenching is not feasible.

Before Situation:

Livestock have an inadequate or unacceptable water supply which can lead to compromised animal health. Water can be supplied from a central source(s) by piping to one or more locations in the pasture. Soil conditions are suitable for pipe installation without bedding.

After Situation:

A 2½ inch diameter, Schedule 40 PVC plastic pipeline for stockwatering, 3300 ft long is installed for supplying water in a managed grazing system, to reduce soil erosion, improve water quality, improve health and vigor of key forage plant species and improve or maintain animal health. Payment includes couplers and fittings. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices include Fencing (382), Prescribed Grazing (528), Trails and Walkways (575), Access Control (472), Pumping Plant (533), Water Well (642), Heavy Use Area (561) and Watering Facility (614).

Scenario Feature Measure: Foot

Scenario Unit: Linear Foot

Scenario Typical Size: 3,300

Scenario Cost: $10,585.45 **Scenario Cost/Unit:** $3.21

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	12	$654.84
Trencher, 8"	936	Equipment and power unit costs. Labor not included.	Hour	$87.59	25	$2,189.75
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	12	$355.68
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	33	$686.73
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	25	$596.50
Materials						
Pipe, PVC, dia. < 18", weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	$1.50	3856	$5,784.00
Mobilization						
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	$68.80	1	$68.80
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 516 - Livestock Pipeline

Scenario: #4 - Buried Pipeline, >3in

Scenario Description:

Installation of a large diameter plastic pipeline to convey livestock water from a spring development to a watering facility to service a prescribed grazing system.

Before Situation:

Livestock have an inadequate or unacceptable water supply which can lead to compromised animal health. Water can be supplied from a central source such as a spring by piping to a watering facility. Soil conditions are suitable for pipe installation without bedding.

After Situation:

A delivery pipe (typically 4" diameter, Schedule 40 PVC Plastic) from a spring development to a watering facility, or from water source to watering facility for gravity flow systems. The pipeline is installed as a facilitating practice for supplying water in a managed grazing system, to reduce soil erosion, improve water quality, improve health and vigor of key forage plant species and improve or maintain animal health. Payment incorporates couplers and fittings. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices include Fencing (382), Prescribed Grazing (528), Trails and Walkways (575), Access Control (472), Pumping Plant (533), Water Well (642), Heavy Use Area (561) and Watering Facility (614).

Scenario Feature Measure: Foot

Scenario Unit: Linear Foot

Scenario Typical Size: 800

Scenario Cost: $4,484.63 **Scenario Cost/Unit:** $5.61

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 12" x 60"	1459	Trenching, earth, 12" wide x 60" depth, includes equipment and labor for trenching, laying 3"-6" CPP drain line with envelope, and backfilling.	Foot	$1.82	800	$1,456.00
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	8	$166.48
Materials						
Pipe, PVC, dia. < 18", weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	$1.50	1742	$2,613.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 516 - Livestock Pipeline

Scenario: #5 - Bedded Pipeline

Scenario Description:

Installation of a gravel-bedded plastic pipeline in locations or conditions where the gravel bedding is necessary component of pipeline installation due to shallow bedrock, excessively rocky or otherwise unfavorable soil conditions so that the pipeline is evenly supported and protected from damage throughout the length of the trench. The purpose of the pipeline installation is to convey water from a water supply source to points of use for livestock in a prescribed grazing system or wildlife.

Before Situation:

Livestock have an inadequate or unacceptable water supply which can lead to compromised animal health. Water can be supplied from a central source(s) by piping to one or more locations in the pasture. Soil conditions (excessively stoney soil, unstable soil or frequent crossing by heavy equipment) requires the pipe to be protected by gravel backfill.

After Situation:

1600 feet of Schedule 40 PVC plastic pipeline (800' of 1 1/2" diameter, and 800' of 2 1/2" diameter) is installed in gravel bedding in pastureland as part of a livestock water delivery system. The pipeline is installed as a facilitating practice for supplying water in a managed grazing system, to reduce soil erosion, improve water quality, improve health and vigor of key forage plant species and improve or maintain animal health. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices include Fencing (382), Prescribed Grazing (528), Trails and Walkways (575), Access Control (472), Pumping Plant (533), Water Well (642), Heavy Use Area (561) and Watering Facility (614).

Scenario Feature Measure: Foot

Scenario Unit: Linear Foot

Scenario Typical Size: 1,600

Scenario Cost: $6,557.94 **Scenario Cost/Unit:** $4.10

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	24	$1,309.68
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	24	$711.36
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	16	$332.96
Materials						
Pipe, PVC, 1 ½", SCH 40	975	Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785	Foot	$1.04	800	$832.00
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	59.3	$1,720.29
Pipe, PVC, dia. < 18", weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	$1.50	935	$1,402.50
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 516 - Livestock Pipeline

Scenario: #6 - Cased Pipeline with Boring

Scenario Description:

Installation of a 2"- 3" plastic pipeline within an outer casing, bored under a road or other obstruction to convey water from a source of supply to points of use for livestock in a prescribed grazing system or wildlife.

Before Situation:

Livestock have an inadequate or unacceptable water supply which can lead to compromised animal health. Water can be supplied from a central source(s) by piping to one or more locations in the pasture. Soil conditions or location require boring to facilitate pipe installation.

After Situation:

The typical installation consists of installing 60 feet of a 2.5 inch, Schedule 40 PVC plastic pipe with a 4 inch outer casing under a roadbed. Pipeline boring includes all pipe under roadbed and labor and equipment involved during installation of pipe. The pipeline is installed as a facilitating practice for supplying water in a managed grazing system, to reduce soil erosion, improve water quality, improve health and vigor of key forage plant species and improve or maintain animal health. Payment incorporates couplers and fittings. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices include Fencing (382), Prescribed Grazing (528), Trails and Walkways (575), Access Control (472), Pumping Plant (533), Water Well (642), Heavy Use Area (561) and Watering Facility (614).

Scenario Feature Measure: Foot

Scenario Unit: Linear Foot

Scenario Typical Size: 60

Scenario Cost: $4,249.33 **Scenario Cost/Unit:** $70.82

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Horizontal Boring, > 3" diameter	1132	Includes equipment, labor and setup.	Foot	$50.99	60	$3,059.40
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	1	$54.57
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	2	$41.62
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	1	$29.64
Materials						
Pipe, PE, 4", DR 9	1002	Materials: - 4" - PE - 160 psi - ASTM D3035 DR 9	Foot	$7.68	60	$460.80
Pipe, PVC, dia. < 18", weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	$1.50	70	$105.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	2	$498.30

Practice: 521A - Pond Sealing or Lining, Flexible Membrane

Scenario: #1 - Flexible Membrane - Uncovered without liner drainage or venting

Scenario Description:

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes a geotextile or soil cushion to protect the liner from subgrade damage. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits.

After Situation:

Water conservation and enviromental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Scenario Feature Measure: Surface area of Liner Material (including anchorage)

Scenario Unit: Square Yard

Scenario Typical Size: 2,420

Scenario Cost: $24,312.08 **Scenario Cost/Unit:** $10.05

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	2420	$5,759.60
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	40	$1,247.60
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	32	$3,026.88
Materials						
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	$5.90	2420	$14,278.00

Practice: 521A - Pond Sealing or Lining, Flexible Membrane

Scenario: #2 - Flexible Membrane - Uncovered with liner drainage or venting

Scenario Description:

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes a geotextile or soil cushion to protect the liner from subgrade damage, and liner drainage or venting. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits.

After Situation:

Water conservation and enviromental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Scenario Feature Measure: Surface area of Liner Material (including anchorage)

Scenario Unit: Square Yard

Scenario Typical Size: 2,420

Scenario Cost: $31,547.88 **Scenario Cost/Unit:** $13.04

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	2420	$5,759.60
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	40	$1,247.60
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	32	$3,026.88
Materials						
Geonet	1778	Geosynthetic drainage liner, typically HDPE of 300 mil thickness. Includes materials and shipping only.	Square Yard	$2.99	2420	$7,235.80
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	$5.90	2420	$14,278.00

Practice: 521A - Pond Sealing or Lining, Flexible Membrane

Scenario: #3 - Flexible Membrane - Covered without liner drainage or venting

Scenario Description:

Installation of a flexible geosynthetic membrane liner to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes 1 foot of soil cover for liner protection, and a geotextile or soil cushion to protect liner from subgrade damage. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits.

After Situation:

Water conservation and enviromental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Scenario Feature Measure: Surface area of Liner Material (including anchorage)

Scenario Unit: Square Yard

Scenario Typical Size: 2,420

Scenario Cost: $27,693.41 **Scenario Cost/Unit:** $11.44

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$4.19	807	$3,381.33
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	2420	$5,759.60
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	32	$3,026.88
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	40	$1,247.60
Materials						
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	$5.90	2420	$14,278.00

Practice: 521A - Pond Sealing or Lining, Flexible Membrane

Scenario: #4 - Flexible Membrane - Covered with liner drainage or venting

Scenario Description:

Installation of a flexible geosynthetic membrane liner to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes 1 foot of soil cover for liner protection, a geotextile or soil cushion to protect liner from subgrade damage, and liner drainage or venting. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits.

After Situation:

Water conservation and enviromental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Scenario Feature Measure: Surface area of Liner Material (including anchorage)

Scenario Unit: Square Yard

Scenario Typical Size: 2,420

Scenario Cost: $34,929.21 **Scenario Cost/Unit:** $14.43

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	2420	$5,759.60
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$4.19	807	$3,381.33
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	$31.19	40	$1,247.60
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	32	$3,026.88
Materials						
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	$5.90	2420	$14,278.00
Geonet	1778	Geosynthetic drainage liner, typically HDPE of 300 mil thickness. Includes materials and shipping only.	Square Yard	$2.99	2420	$7,235.80

Practice: 521B - Pond Sealing or Lining, Soil Dispersant

Scenario: #1 - Soil Dispersant - Uncovered

Scenario Description:

Construction of a compacted soil liner, treated with a soil dispersant, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the dispersant with the soil liner under proper moisture conditions and compaction to the designed liner thickness. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Scenario Feature Measure: Volume of Liner Material

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,613

Scenario Cost: $11,030.40 **Scenario Cost/Unit:** $6.84

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	$53.21	6	$319.26
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$4.19	1613	$6,758.47
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	2	$189.18
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	6	$143.16
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	8	$309.20
Materials						
Soil Dispersant	1490	Soil Amendment (tetrasodium pyrophosphate (TSPP), sodium tripolyphosphate (STPP), or soda ash or approved equivalent)	Ton	$468.91	6.53	$3,061.98
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 521B - Pond Sealing or Lining, Soil Dispersant

Scenario: #2 - Soil Dispersant - Covered

Scenario Description:

Construction of a compacted soil liner, treated with a soil dispersant, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the dispersant with the soil liner under proper moisture conditions, compaction to the designed liner thickness, and placement of soil cover over the treated liner. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Scenario Feature Measure: Volume of Liner Material including Soil Cover over Liner

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,613

Scenario Cost: $17,788.87 **Scenario Cost/Unit:** $11.03

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	$53.21	6	$319.26
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$4.19	3226	$13,516.94
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	8	$309.20
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	6	$143.16
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	2	$189.18
Materials						
Soil Dispersant	1490	Soil Amendment (tetrasodium pyrophosphate (TSPP), sodium tripolyphosphate (STPP), or soda ash or approved equivalent)	Ton	$468.91	6.53	$3,061.98
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 521C - Pond Sealing or Lining, Bentonite Sealant

Scenario: #1 - Bentonite Treatment - Uncovered

Scenario Description:

Construction of a compacted soil liner, treated with bentonite, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the bentonite with the soil under proper moisture conditions, compaction to the designed liner thickness. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Scenario Feature Measure: Volume of Liner Material

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,613

Scenario Cost: $68,108.37 **Scenario Cost/Unit:** $42.22

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$4.19	1613	$6,758.47
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	$53.21	6	$319.26
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	2	$189.18
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	2	$77.30
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	6	$143.16
Materials						
Bentonite	41	Bentonite, includes materials (50# bag)	Each	$11.55	5227	$60,371.85
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 521C - Pond Sealing or Lining, Bentonite Sealant

Scenario: #2 - Bentonite Treatment - Covered

Scenario Description:

Construction of a compacted soil liner, treated with bentonite, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the bentonite with the soil under proper moisture conditions, compaction to the designed liner thickness, and placement of soil cover over the treated liner. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with bentonite.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Scenario Feature Measure: Volume of Liner Material (includes 1 foot of soil cover over liner)

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,613

Scenario Cost: $74,871.03 **Scenario Cost/Unit:** $46.42

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	$53.21	6	$319.26
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$4.19	3227	$13,521.13
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	6	$143.16
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	2	$77.30
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	2	$189.18
Materials						
Bentonite	41	Bentonite, includes materials (50# bag)	Each	$11.55	5227	$60,371.85
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 521D - Pond Sealing or Lining, Compacted Clay Treatment

Scenario: #1 - Compacted Earth Liner with Soil Cover

Scenario Description:

Construction of a compacted soil liner, treated with compacted clay, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the soil liner under proper moisture conditions to the designed liner thickness, and soil cover to protect the finished liner. Scenario includes a 12" compacted clay liner with 6" of soil cover covering an area 1 acre in size. Material haul < 1 mile. Associated practices include PS378, PS313, & other waste water impoundments.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. An adequate quantity of soil suitable for constructing a clay liner without amendments is available at an econical haul distance. Material haul < 1 mile.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Scenario Feature Measure: Volume of Liner Material including soil cover over liner

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,613

Scenario Cost: $15,259.85 **Scenario Cost/Unit:** $9.46

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$4.19	1613	$6,758.47
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.44	807	$2,776.08
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.48	2420	$3,581.60
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	15	$1,418.85
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$475.70	1	$475.70

Practice: 521D - Pond Sealing or Lining, Compacted Clay Treatment

Scenario: #2 - Compacted Earth Liner

Scenario Description:

Construction of a compacted soil liner, treated with compacted clay, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the soil liner under proper moisture conditions to the designed liner thickness, and soil cover to protect the finished liner. Scenario includes a 12" compacted clay liner covering an area 1 acre in size. Material haul < 1 mile. Associated practices include PS378, PS313, & other waste water impoundments.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. An adequate quantity of soil suitable for constructing a clay liner without amendments is available at an econical haul distance. Material haul < 1 mile.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Scenario Feature Measure: Volume of Liner Material

Scenario Unit: Cubic Yard

Scenario Typical Size: 1,613

Scenario Cost: $11,289.41 **Scenario Cost/Unit:** $7.00

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$4.19	1613	$6,758.47
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.48	1613	$2,387.24
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	$94.59	15	$1,418.85
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$475.70	1	$475.70

Practice: 528 - Prescribed Grazing

Scenario: #1 - Low Intensity, > 7 Day Rotation Frequency

Scenario Description:

Design and implementation of a grazing system that will enhance pasture condition and ecosystem function as well as optimize efficiency and economic return through monitoring (ex:photo points, stubble height after grazing, etc) & record keeping. Livestock graze each pasture for more than seven (7) days in rotation and adequate rest is provided for the forages.

Before Situation:

Current grazing system exhibits undesirable and inefficient use of forage plants and such use has a negative impact on pasture condition as well as soil and water resources. Inefficient use results in overgrazing, spot grazing, livestock trailing, concentration areas, uncontrolled access to streams and ponds, ephemeral erosion, gully erosion, streambank erosion. Stocking rates are higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

After Situation:

Typical scenario is based on a grazing system consisting of a 30 animal unit cow/calf operation (including bull(s), calves and replacement females) on 80 acres. Activities include farm labor to mow or clip pastures; monitor and measure forage growth; complete record keeping; analyze plant growth and animal performance; and make decisions or other management techniques. Management techniques reduce the use of supplemental feed, control weeds, and reduce energy requirements. Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through protection of sensitive areas and efficient harvest of forage resources. Runoff, sediment and nutrient loss are reduced by improving plant density, diversity and percent cover. Grazing system success is evaluated through short term monitoring and maintaining grazing stop height requirements. Acquisition of technical knowledge needed to effectively implement prescribed grazing. Costs and activities are typical for conventional and organic producers. Associated Practices: (511) Forage Harvest Management, (512) Forage and Biomass Planting, (590) Nutrient Management, (595) Integrated Pest Management, (561) Heavy Use Area Protection, (382) Fence, (614) Watering Facility, (378) Pond, (642) Water Well, (314) Brush Management, (315) Herbaceous Weed Control, (338) Prescribed Burning.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 80

Scenario Cost: $2,105.19 **Scenario Cost/Unit:** $26.31

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Acquisition of Technical Knowledge						
Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$44.18	1	$44.18
Equipment/Installation						
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	$29.86	10	$298.60
Rangeland/grassland field monitoring kit	967	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only.	Each	$45.96	1	$45.96
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	60	$1,248.60
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	15	$467.85

Practice: 528 - Prescribed Grazing

Scenario: #2 - Medium Intensity, 7-3 Days Rotation Frequency

Scenario Description:

Design and implementation of a grazing system that will enhance pasture condition and ecosystem function as well as optimize efficiency and economic return through monitoring (ex:photo points, stubble height after grazing, etc) & record keeping. Livestock graze each pasture from three (3) to seven (7) days in rotation. Rotation is based on monitoring livestock demand and supply.

Before Situation:

Current grazing system exhibits undesirable and inefficient use of forage plants and such use has a negative impact on pasture condition, as well as soil and water resources. Inefficient use results in overgrazing, spot grazing, livestock trailing, concentration areas, uncontrolled access to streams and ponds, ephemeral erosion, gully erosion, streambank erosion. Stocking rates are higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

After Situation:

Typical scenario is based on a grazing system consisting of a 30 animal unit cow/calf operation (including bull(s), calves and replacement females) on 80 acres. Scenario results in an increase (above the low intensity option) in labor required to complete the following activities: farm labor to mow or clip pastures; monitor and measure forage growth; complete record keeping; analyze plant growth and animal performance; and make decisions or other management techniques. Management techniques reduce the use of supplemental feed, control weeds, and reduce energy requirements. Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through protection of sensitive areas and efficient harvest of forage resources. Runoff, sediment and nutrient loss are reduced by improving plant density, diversity and percent cover. Grazing system success is evaluated through short term monitoring and maintaining grazing stop height requirements. Acquisition of technical knowledge needed to effectively implement prescribed grazing. Costs and activities are typical for conventional and organic producers. Associated Practices: (511) Forage Harvest Management, (512) Forage and Biomass Planting, (590) Nutrient Management, (595) Integrated Pest Management, (561) Heavy Use Area Protection, (382) Fence, (614) Watering Facility, (378) Pond, (642) Water Well, (314) Brush Management, (315) Herbaceous Weed Control, (338) Prescribed Burning.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 80

Scenario Cost: $3,243.66 **Scenario Cost/Unit:** $40.55

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	$29.86	20	$597.20
Rangeland/grassland field monitoring kit	967	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only.	Each	$45.96	1	$45.96
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	80	$1,664.80
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	30	$935.70

Practice: 528 - Prescribed Grazing

Scenario: #3 - High Intensity, ≤2 Day Rotation Frequency

Scenario Description:

Design and implementation of a grazing system that will enhance pasture condition and ecosystem function as well as optimize efficiency and economic return through monitoring (ex:photo points, stubble height after grazing, etc) & record keeping. Livestock graze each pature/paddock from less than three (3) days in rotation. Rotation is based on monitoring livestock demand and supply.

Before Situation:

Current grazing system exhibits undesirable and inefficient use of forage plants and such use has a negative impact on pasture condition, as well as soil and water resources. Inefficient use results in overgrazing, spot grazing, livestock trailing, concentration areas, uncontrolled access to streams and ponds, ephemeral erosion, gully erosion, streambank erosion. Stocking rates are higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

After Situation:

Typical scenario is based on a grazing system consisting of a 30 animal unit cow/calf operation (including bull(s), calves and replacement females) on 80 acres. Scenario results in an increase (above the medium intensity option) in labor required to complete the following activities: farm labor to mow or clip pastures; monitor stop grazing heights and measure forage growth; complete record keeping; analyze plant growth and animal performance; and make decisions or other management techniques. Management techniques reduce the use of supplemental feed, control weeds, and reduce energy requirements. Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through protection of sensitive areas and efficient harvest of forage resources. Runoff, sediment and nutrient loss are reduced by improving plant density, diversity and percent cover. Grazing system success is evaluated through short term monitoring and maintaining grazing stop height requirements. Acquisition of technical knowledge needed to effectively implement prescribed grazing. Costs and activities are typical for conventional and organic producers. Associated Practices: (511) Forage Harvest Management, (512) Forage and Biomass Planting, (590) Nutrient Management, (595) Integrated Pest Management, (561) Heavy Use Area Protection, (382) Fence, (614) Watering Facility, (378) Pond, (642) Water Well, (314) Brush Management, (315) Herbaceous Weed Control, (338) Prescribed Burning.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 80

Scenario Cost: $4,558.85 **Scenario Cost/Unit:** $56.99

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Acquisition of Technical Knowledge						
Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$44.18	3	$132.54
Equipment/Installation						
Rangeland/grassland field monitoring kit	967	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only.	Each	$45.96	1	$45.96
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	$29.86	30	$895.80
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	100	$2,081.00
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	45	$1,403.55

Practice: 528 - Prescribed Grazing

Scenario: #4 - Enhanced - Strip Grazing

Scenario Description:

Design and implementation of a grazing system that will enhance pasture condition and ecosystem function as well as optimize efficiency and economic return through monitoring (ex: photos points, stubble height after grazing, etc.) & record keeping. Livestock are part of a managed grazing system which includes utilization of management techniques such as stockpiling/strip grazing to assist in extending the grazing season and improve animal demand and supply efficiency, or summer strip grazing on mature pasture to improve soil health by maintaining and/or improving ideal cover, plant diversity, organic matter and soil temperatures favorable for sustained microbial life.

Before Situation:

Current grazing system exhibits undesirable and inefficient use of forage plants and such use has a negative impact on pasture condition, as well as soil and water resources. Inefficient use results in overgrazing, spot grazing, livestock trailing, concentration areas, uncontrolled access to streams and ponds, ephemeral erosion, gully erosion, streambank erosion. Stocking rates are higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

After Situation:

Typical scenario is based on a grazing system consisting of a 30 animal unit cow/calf operation (including bull(s), calves and replacement females) on 80 acres for a 200 to 290 day grazing season. Scenario results in an increase (above the Standard option) in labor required to complete the following activities: farm labor to mow or clip pastures; monitor and measure forage growth; complete record keeping; analyze plant growth and animal performance; and make decisions or other management techniques. Management techniques reduce the use of supplemental feed, control weeds, and reduce energy requirements. Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through protection of sensitive areas and efficient harvest of forage resources. Runoff, sediment and nutrient loss are reduced by improving plant density, diversity and percent cover. Grazing system success is evaluated through short term monitoring. Acquisition of technical knowledge needed to effectively implement prescribed grazing. Consultant or TSP used to develop detailed grazing plan. Costs and activities are typical for conventional and organic producers. Associated Practices: (511) Forage Harvest Management, (512) Forage and Biomass Planting, (590) Nutrient Management, (595) Integrated Pest Management, (561) Heavy Use Area Protection, (382) Fence, (614) Watering Facility, (378) Pond, (642) Water Well, (314) Brush Management, (315) Herbaceous Weed Control, (338) Prescribed Burning.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 80

Scenario Cost: $5,464.65 **Scenario Cost/Unit:** $68.31

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Acquisition of Technical Knowledge						
Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$44.18	3	$132.54
Equipment/Installation						
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	$29.86	30	$895.80
Rangeland/grassland field monitoring kit	967	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only.	Each	$45.96	1	$45.96
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	100	$2,081.00
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	8	$756.72
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	45	$1,403.55

Materials

Nutritional Balance Analyzer, fecal sample analysis only	1127	NIRS fecal analysis, animal performance report. Includes materials and shipping only.	Each	$37.27	4	$149.08

Practice: 528 - Prescribed Grazing

Scenario: #5 - High Density Grazing

Scenario Description:

An improved grazing management system where livestock are grazed on pasture for at least 300 days per calendar year and managed at a stock density of at least 50,000 lbs for 75% of the grazing days. Pastures will be managed for a livestock utilization rate of 60% or less per grazing event.

Before Situation:

Current grazing system exhibits undesirable and inefficient use of forage plants and such use has a negative impact on pasture condition, as well as soil and water resources. Inefficient use results in overgrazing, spot grazing, livestock trailing, concentration areas, uncontrolled access to streams and ponds, ephemeral erosion, gully erosion, streambank erosion. Stocking rates are higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

After Situation:

A grazing system for a 30 animal unit cow-calf operation (includes bull(s), calves and replacement females) on 80 acres and designed for a 300 day grazing season. The grazing system has a stock density of at least 50,000 pounds for 75% of the grazing days. Pastures will be monitored and measure pasture growth to ensure a livestock utilization rate of 60% or less per grazing event. Acquisition of technical knowledge needed to effectively implement prescribed grazing is included. Management techniques will improve soil condition, reduce soil compaction, reduce the use of supplemental feed, reduce the need for weed control, and reduce energy requirements. Consultant or TSP used to develop detailed grazing plan. Costs and activities are typical for conventional and organic producers. Associated Practices: (511) Forage Harvest Management, (512) Forage and Biomass Planting, (590) Nutrient Management, (595) Integrated Pest Management, (561) Heavy Use Area Protection, (382) Fence, (614) Watering Facility, (378) Pond, (642) Water Well, (314) Brush Management, (315) Herbaceous Weed Control, (338) Prescribed Burning.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 80

Scenario Cost: $6,221.37 **Scenario Cost/Unit:** $77.77

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Acquisition of Technical Knowledge						
Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$44.18	3	$132.54
Equipment/Installation						
Rangeland/grassland field monitoring kit	967	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only.	Each	$45.96	1	$45.96
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	$29.86	30	$895.80
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	45	$1,403.55
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	100	$2,081.00
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	16	$1,513.44
Materials						
Nutritional Balance Analyzer, fecal sample analysis only	1127	NIRS fecal analysis, animal performance report. Includes materials and shipping only.	Each	$37.27	4	$149.08

Practice: 528 - Prescribed Grazing

Scenario: #8 - Biological Control with Grazing Animals

Scenario Description:

Management of herbaceous and/or woody plant species through the use of livestock such as goats, sheep or other grazing animal that will graze on the undesireable species. Payment is based on impacted acres only. Payment is based on the use of goats for problems where a stocking rate equivalent of 50 goats can adequately clear 1 acre of undesireable herbaceous species in one day (or equivalent stocking; for example 5 goats for 1 week to clear an acre), or equivalent number of other livestock. Costs are related to transportation of livestock, setting up temporary fencing and/or watering system. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Before Situation:

Area consists of herbaceous and/or woody weed species such as, but not limited to sericia lespedeza, japanese stilt grass, periwinkle, ironweed, ragweed, Amur cork tree, Siberian elm, callery pear, autumn olive, multiflora rose, barberry, burning bush, or honeysuckle, etc. that exceed the desirable ecological site condition degrading forage quality, promoting noxious and invasive species, increasing risk of soil erosion and degrading wildlife habitat. Undesirable species can contribute to degraded plant condition, inadequate feed & forage, and potential animal health issues.

After Situation:

Livestock grazing is managed to limit the regrowth of weed species and achieve a desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend and plant health and vigor is returning to near normal levels.

Scenario Feature Measure: Acres treated

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $774.98 **Scenario Cost/Unit:** $774.98

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	8	$166.48
Materials						
Animals used for biological weed control	1130	Goats, Llamas, Sheep - Includes all support: fence, water, dog, mob, etc. Includes materials and shipping only.	Head per day	$12.17	50	$608.50

Practice: 533 - Pumping Plant

Scenario: #1 - Wastewater Pump < 1 Hp

Scenario Description:

Scenario is for the implentation of a electric chopper screw pump of less than 1 horsepower. Implementation examples include, but are not limited to, pumping wastewater from the source to a storage facility such as in a dairy milk parlor, or pumping supernatant from the sump of a settling basin to a level spreader device upstream of a Vegetated Treatment Area, in flat topography where gravity flow from the settling basin is not feasible. Payment includes the pump and controls, installation and concrete pad base for the pump.

Before Situation:

Dairy milk parlor wastewater is not managed properly, or feedlot runoff enters a nearby stream, causing water quality concerns through excessive nutrients, organics, and pathogen. The resource concerns to be addressed are for water quality, air quality, and domestic animal health.

After Situation:

Practice typically installed for transfer of wastewater to a storage facility using 3/4 HP chopper/screw pump. Dairy milk parlor wastewater is directed to a waste storage facility, or feedlot runoff is directed to a solid/liquid settling basin, and supernatant is pumped from the sump of the settling basin to a Vegetated Treatment Area. Contaminated water no longer enters the stream. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Associated Practices include: 374 - Farmstead Energy Improvement; 313 - Waste Storage Facility; 634 - Waste Transfer; 633 Waste Utilization; 632 Solid/liquid Waste Separation Facility; 635 Vegetated Treatment Area

Scenario Feature Measure: Per Pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $1,315.26 **Scenario Cost/Unit:** $1,315.26

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	$128.74	0.25	$32.19
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	2	$41.62
Materials						
Pump, Wastewater, Solids Handling < 1 HP	2514	Wastewater solid handling pump less than 1 horsepower. Pumping capacity of 20 gallons per minute at 30 feet of Total Dynamic Head. Includes materials and shipping only.	Each	$1,241.45	1	$1,241.45

Practice: 533 - Pumping Plant

Scenario: #2 - Wastewater Pump 1-5 Hp

Scenario Description:

Scenario is for the implentation of a electric chopper screw pump of 1-5 horsepower. Implementation examples include, but are not limited to, pumping wastewater from the source to a storage facility such as in a dairy milk parlor, or pumping supernatant from the sump of a settling basin to a level spreader device upstream of a Vegetated Treatment Area, in flat topography where gravity flow from the settling basin is not feasible. Payment includes the pump and controls, installation and concrete pad base for the pump.

Before Situation:

Dairy milk parlor wastewater is not managed properly, or feedlot runoff enters a nearby stream, causing water quality concerns through excessive nutrients, organics, and pathogen. The resource concerns to be addressed are for water quality, air quality, and domestic animal health.

After Situation:

Practice typically installed for transfer of wastewater to a storage facility using 3 HP chopper/screw pump. Dairy milk parlor wastewater is directed to a waste storage facility, or feedlot runoff is directed to a solid/liquid settling basin, and supernatant is pumped from the sump of the settling basin to a Vegetated Treatment Area. Contaminated water no longer enters the stream. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Associated Practices include: 374 - Farmstead Energy Improvement; 313 - Waste Storage Facility; 634 - Waste Transfer; 633 Waste Utilization; 632 Solid/liquid Waste Separation Facility; 635 Vegetated Treatment Area

Scenario Feature Measure: Per Pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $3,774.94 **Scenario Cost/Unit:** $3,774.94

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	$128.74	0.25	$32.19
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	2	$41.62
Materials						
Pump, Wastewater, Solids Handling, 1 to 5 HP	2515	Wastewater solid handling pump with 1 to 5 horsepower. Pumping capacity of 100 gallons per minute at 30 feet of Total Dynamic Head. Includes materials and shipping only.	Each	$3,701.13	1	$3,701.13

Practice: 533 - Pumping Plant

Scenario: #3 - Manure Pump >5 Hp

Scenario Description:

Scenario is for the implentation of a electric chopper screw pump of >5 horsepower to pump manure from the source to a storage facility. Implementation examples include, but are not limited to, situations where a dairy or swine operation is pumping manure to an above ground storage facility. Payment includes the pump and controls, installation and concrete pad.

Before Situation:

Manure is not managed properly, or feedlot runoff enters a nearby stream, causing water quality concerns through excessive nutrients, organics, and pathogen. The resource concerns to be addressed are for water quality, air quality, and domestic animal health.

After Situation:

Practice typically installed for transfer of manure to a storage facility using 10 HP chopper/screw pump. Manure is directed to a waste storage facility, or feedlot runoff is directed to a solid/liquid settling basin, and supernatant is pumped from the sump of the settling basin to a Vegetated Treatment Area. Contaminated water no longer enters the stream. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Associated Practices include: 374 - Farmstead Energy Improvement; 313 - Waste Storage Facility; 634 - Waste Transfer; 633 Waste Utilization; 632 Solid/liquid Waste Separation Facility; 635 Vegetated Treatment Area

Scenario Feature Measure: Per Pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $7,530.65 **Scenario Cost/Unit:** $7,530.65

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	$128.74	0.25	$32.19
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	2	$41.62
Materials						
Pump, Wastewater, Solids Handling, > 5 HP	2516	Wastewater solid handling pump greater than 5 horsepower. Pumping capacity of 400 gallons per minute at 40 feet of Total Dynamic Head. Includes materials and shipping only.	Each	$7,456.84	1	$7,456.84

Practice: 533 - Pumping Plant

Scenario: #4 - Small Wastewater Fuel Driven Pump ≤ 50 Hp

Scenario Description:

Scenario is for the implentation of a fuel or PTO-driven pump of ≤ 50 horsepower for transferring manure or wastewater. Implementation examples include, but are not limited to, pumping wastewater from a storage facility to an end use such as a field, or transferring manure and wastewater from a shallow pit under a hog confinement building to a deep pit manure storage on the headquarters site. Payment includes all controls and appurtenances needed to mount the pump and connect the pump to the piping system. The piping system and any associated reception tank is specified under 634 - Waste Transfer.

Before Situation:

Various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues. Resource concerns are water quality degradation - excess nutrients in surface and ground waters.

After Situation:

For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

Associated Practices include: 374 - Farmstead Energy Improvement; 313 - Waste Storage Facility; 634 - Waste Transfer

Scenario Feature Measure: Per Pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $23,794.59 **Scenario Cost/Unit:** $23,794.59

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	$128.74	0.25	$32.19
Materials						
Pump, < 50 HP, Pump & ICE power unit	1027	Materials, labor, controls: < 50 HP Pump & ICE power unit	Horsepower	$594.06	40	$23,762.40

Practice: 533 - Pumping Plant

Scenario: #5 - Large Wastewater Fuel Driven Pump > 50 Hp

Scenario Description:

Scenario is for the implentation of a fuel or PTO-driven pump of >50 horsepower for transferring manure or wastewater. Implementation examples include, but are not limited to, moving wastewater from a waste holding pond to a dragline field application system, supplying wastewater to a sprinkler irrigation system, or any other transfer of wasterwater from a storage facility to an end use. Includes all controls and appurtenances needed to mount the pump and connect the pump to the piping system. The piping system and any associated reception tank is specified under 634 - Waste Transfer.

Before Situation:

Various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues. Resource concerns are water quality degradation - excess nutrients in surface and ground waters.

After Situation:

For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

Associated Practices include: 374 - Farmstead Energy Improvement; 313 - Waste Storage Facility; 634 - Waste Transfer

Scenario Feature Measure: Per Pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $30,757.14 **Scenario Cost/Unit:** $30,757.14

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	$128.74	0.25	$32.19
Materials						
Pump, > 70 HP, Pump & ICE power unit	1029	Materials, labor, controls: > 70 HP Pump & ICE power unit	Horsepower	$361.47	85	$30,724.95

Practice: 533 - Pumping Plant

Scenario: #6 - Irrigation Pump

Scenario Description:

The practice is installed to pump irrigation water from the source to a final destination. Payment includes the pump and controls, installation and concrete pad.

Before Situation:

Practice to be installed for management of irrigation water. Conditions include inefficent energy use due to age and type of irrigation pump, poor plant condition, and poor plant health. The resource concerns to be addressed are for inefficient energy use - equipment and facilities, water quality, water quantity, plant condition, and plant health.

After Situation:

Practice typically installed for transfer of irrigation water to a final destination using 50 HP pump. Conservation benefits of the installation are improved efficiency for the delivery of irrigation water. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Associated Practices: 430 Irrigation Pipeline, 442 Irrigation System - Sprinkler, 449 Irrigation Water Management, 590 nutrient management, 595 integrated pest management; 374-Farmstead Energy Improvement

Scenario Feature Measure: per pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $29,735.19 **Scenario Cost/Unit:** $29,735.19

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	$128.74	0.25	$32.19
Materials						
Pump, < 50 HP, Pump & ICE power unit	1027	Materials, labor, controls: < 50 HP Pump & ICE power unit	Horsepower	$594.06	50	$29,703.00

Practice: 533 - Pumping Plant

Scenario: #7 - Micro Irrigation Pump

Scenario Description:

The practice is installed to pump irrigation water from the source to a final destination for a micro irrigation system. Payment includes the pump and controls, installation and concrete pad.

Before Situation:

Practice to be installed for management of irrigation water. Conditions include inefficency of irrigation pump due to age and type, poor plant condition, and poor plant health. The resource concerns to be addressed are for water quality, water quantity, plant condition, and plant health.

After Situation:

Practice typically installed for transfer of irrigation water to a final destination using 1 HP pump. Conservation benefits of the installation are improved efficiency for the delivery of irrigation water. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Associated Practices: 430 Irrigation Pipeline, 441 Irrigation System - Microirrigation, 449 Irrigation Water Management, 590 nutrient management, 595 integrated pest management; 374-Farmstead Energy Improvement

Scenario Feature Measure: per pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $1,472.38 **Scenario Cost/Unit:** $1,472.38

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	$128.74	0.25	$32.19
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	3	$62.43
Materials						
Pressure Tank, 40 gallon	1038	Pressure Tank, 40 gallon. Includes materials and shipping only.	Each	$447.54	1	$447.54
Pump, ≤ 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and moto	Horsepower	$399.47	1	$399.47
Pump, ≤ 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will	Each	$530.75	1	$530.75

Practice: 533 - Pumping Plant

Scenario: #8 - Solar Pump for Well

Scenario Description:

The scenario is for the installation of a solar panel array, pump, pressure tank, and appurtenances in a well for supplying water to livestock in situations where standard electric power is inaccessible The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Payment does not include battery backup.

Before Situation:

Practice to be installed on grazing land. Current conditions include inadequate water supply, poor water quality, degraded site condtions leading to erosion concerns, poor grazing distribution, and poor livestock health. The resource concerns to be addressed are Inadequate supply of water, grazing distribution, and degraded site conditions leading to poor animal health.

After Situation:

The typical scenario assumes installation of a 200-watt photovoltaic (PV) panel. The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion.

Associated Practices include: 516 - Livestock Pipeline; 642 Water Well, 528 Prescribed Grazing and, 614 - Watering Facility.

Scenario Feature Measure: Pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $3,124.25 **Scenario Cost/Unit:** $3,124.25

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	3	$62.43
Materials						
Solar Panels, fixed cost portion	1031	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will incl	Each	$432.48	1	$432.48
Pump, ≤ 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and moto	Horsepower	$399.47	0.25	$99.87
Pump, ≤ 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will	Each	$530.75	1	$530.75
Pressure Tank, 40 gallon	1038	Pressure Tank, 40 gallon. Includes materials and shipping only.	Each	$447.54	1	$447.54
Solar Panels, variable cost portion	1135	Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all ma	Kilowatt	$7,755.90	0.2	$1,551.18

Practice: 533 - Pumping Plant

Scenario: #9 - Solar Pump for Pond

Scenario Description:

The scenario is for the installation of a solar panel array, and pump from a pond for supplying water to livestock in situations where standard electric power is inaccessible The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Payment does not include battery backup.

Before Situation:

Practice to be installed on grazing land. Current conditions include inadequate water supply, poor water quality, degraded site condtions leading to erosion concerns, poor grazing distribution, and poor livestock health. The resource concerns to be addressed are Inadequate supply of water, grazing distribution, and degraded site conditions leading to poor animal health.

After Situation:

The typical scenario assumes installation of a 200-watt photovoltaic (PV) panel. The installation includes the pump, wiring, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing pond at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion.

Associated Practices include: 516 - Livestock Pipeline; 528 Prescribed Grazing and, 614 - Watering Facility.

Scenario Feature Measure: Pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $2,655.90 **Scenario Cost/Unit:** $2,655.90

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	2	$41.62
Materials						
Pump, ≤ 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will	Each	$530.75	1	$530.75
Solar Panels, variable cost portion	1135	Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all ma	Kilowatt	$7,755.90	0.2	$1,551.18
Solar Panels, fixed cost portion	1031	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will incl	Each	$432.48	1	$432.48
Pump, ≤ 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and moto	Horsepower	$399.47	0.25	$99.87

Practice: 533 - Pumping Plant

Scenario: #10 - Livestock Water, Shallow Well Pump (≤ 25 ft deep)

Scenario Description:

The scenario is for the installation of a pump and pressure tank in a shallow well (≤ 25 feet deep) or collection for supplying water to livestock. Payment includes pump, controls, pressure tank and installation.

Before Situation:

Practice to be installed on grazing land. Current conditions include inadequate water supply, poor water quality, degraded site condtions leading to erosion concerns, poor grazing distribution, and poor livestock health. The resource concerns to be addressed are Inadequate supply of water, grazing distribution, and degraded site conditions leading to poor animal health.

After Situation:

Practice typically installed for 30 animal units and consists of installing a centrifigal pump, pressure tank, and appurtenances for a shallow draw watering system. Conservation benefits of the installation is proper grazing distribution, which will allow a degraded site to be restored. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Associated practices: 528 Prescribed Grazing, 516 Pipeline, 614 Watering Facility, 642 Water Well; 574 Spring Development

Scenario Feature Measure: per pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $1,440.19 **Scenario Cost/Unit:** $1,440.19

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	3	$62.43
Materials						
Pressure Tank, 40 gallon	1038	Pressure Tank, 40 gallon. Includes materials and shipping only.	Each	$447.54	1	$447.54
Pump, ≤ 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and moto	Horsepower	$399.47	1	$399.47
Pump, ≤ 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will	Each	$530.75	1	$530.75

Practice: 533 - Pumping Plant

Scenario: #11 - Livestock Water, Shallow Well Pump (≤ 25ft deep) with Above Ground Pump House

Scenario Description:

The scenario is for the installation of a pump and pressure tank in a shallow well (≤25 feet deep) or collection for supplying water to livestock. Payment includes pump, controls, pressure tank and installation. Payment also includes a pump house installed above ground for situations where there is not an existing sheltered location for the pump to be installed.

Before Situation:

Practice to be installed on grazing land. Current conditions include inadequate water supply, poor water quality, degraded site condtions leading to erosion concerns, poor grazing distribution, and poor livestock health. The resource concerns to be addressed are Inadequate supply of water, grazing distribution, and degraded site conditions leading to poor animal health.

After Situation:

Practice typically installed for 30 animal units and consists of installing a centrifigal pump, pressure tank, and appurtenances for a shallow draw watering system. A 5' x 4' x 5' (100 cu ft) prefabricated concrete above ground pump house is installed above ground on a 8' x 8' x 1' gravel pad. An above ground pump house is utilized where burying is not feasible in a cost effective manner due to shallow soils. Conservation benefits of the installation is proper grazing distribution, which will allow a degraded site to be restored. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Associated practices: 528 Prescribed Grazing, 516 Pipeline, 614 Watering Facility, 642 Water Well; 574 Spring Development.

Scenario Feature Measure: per pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $2,328.05 **Scenario Cost/Unit:** $2,328.05

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	7	$145.67
Materials						
Pump House, Above Ground	2470	Above ground prefabricated pump house. Includes material and shipping only.	Each	$735.00	1	$735.00
Pressure Tank, 40 gallon	1038	Pressure Tank, 40 gallon. Includes materials and shipping only.	Each	$447.54	1	$447.54
Pump, ≤ 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and moto	Horsepower	$399.47	1	$399.47
Pump, ≤ 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will	Each	$530.75	1	$530.75
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	2.4	$69.62

Practice: 533 - Pumping Plant

Scenario: #12 - Livestock Water, Shallow Well Pump (≤ 25 ft deep) with Buried Pump House

Scenario Description:

The scenario is for the installation of a pump and pressure tank in a shallow well (≤ 25 feet deep) or collection for supplying water to livestock. Payment includes pump, controls, pressure tank and installation. Payment also includes a buried pump house for situations where there is not an existing sheltered location for the pump to be installed.

Before Situation:

Practice to be installed on grazing land. Current conditions include inadequate water supply, poor water quality, degraded site condtions leading to erosion concerns, poor grazing distribution, and poor livestock health. The resource concerns to be addressed are Inadequate supply of water, grazing distribution, and degraded site conditions leading to poor animal health.

After Situation:

Practice typically installed for 30 animal units and consists of installing a centrifigal pump, pressure tank, and appurtenances for a shallow draw watering system. A 160 cu ft concrete well house is buried. A buried pump house is utilized where the ground is such that burying is not difficult and the climate conditions warrant burying for improved protection. Conservation benefits of the installation is proper grazing distribution, which will allow a degraded site to be restored. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Associated practices: 528 Prescribed Grazing, 516 Pipeline, 614 Watering Facility, 642 Water Well; 574 Spring Development.

Scenario Feature Measure: per pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $3,929.60 **Scenario Cost/Unit:** $3,929.60

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$111.14	3	$333.42
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	3	$88.92
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	7	$145.67
Materials						
Pumping Plant Pit, Concrete, 1200 Gallon	1922	Precast concrete septic tank structure, 1200 gal capacity, with access port and ladder. Materials only.	Each	$1,705.67	1	$1,705.67
Pressure Tank, 40 gallon	1038	Pressure Tank, 40 gallon. Includes materials and shipping only.	Each	$447.54	1	$447.54
Pump, ≤ 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and moto	Horsepower	$399.47	1	$399.47
Pump, ≤ 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will	Each	$530.75	1	$530.75
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	1	$29.01
Mobilization						

Mobilization

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

Practice: 533 - Pumping Plant

Scenario: #13 - Livestock Water, Deep Well Pump (>25 ft deep)

Scenario Description:

The scenario is for the installation of a pump and pressure tank in a deep well (> 25 feet) for supplying water to livestock. Payment includes pump, controls, pressure tank and installation.

Before Situation:

Practice to be installed on grazing land. Current conditions include inadequate water supply, poor water quality, degraded site condtions leading to erosion concerns, poor grazing distribution, and poor livestock health. The resource concerns to be addressed are Inadequate supply of water, grazing distribution, and degraded site conditions leading to poor animal health.

After Situation:

Practice typically installed for 30 animal units and consists of installing a jet or submersible pump, pressure tank, and appurtenances for a watering system. When utilizing a pond or stream a sump will be installed and used rather than a well. Conservation benefits of the installation is proper grazing distribution, which will allow a degraded site to be restored. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Associated practices: 528 Prescribed Grazing, 516 Pipeline, 614 Watering Facility, 642 Water Well

Scenario Feature Measure: per pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $1,825.58 **Scenario Cost/Unit:** $1,825.58

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	3	$62.43
Materials						
Pump, ≤ 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will	Each	$530.75	1	$530.75
Pump, ≤ 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and moto	Horsepower	$399.47	1.5	$599.21
Pressure Tank, 80 gallon	1039	Pressure Tank, 80 gallon. Includes materials and shipping only.	Each	$633.19	1	$633.19

Practice: 533 - Pumping Plant

Scenario: #14 - Livestock Water, Deep Well Pump (≤ 25ft deep) with Above Ground Pump House

Scenario Description:

The scenario is for the installation of a pump and pressure tank in a deep well (> 25 feet) for supplying water to livestock. Payment includes pump, controls, pressure tank and installation. Payment also includes a pump house installed above ground for situations where there is not an existing sheltered location for the pump to be installed.

Before Situation:

Practice to be installed on grazing land. Current conditions include inadequate water supply, poor water quality, degraded site condtions leading to erosion concerns, poor grazing distribution, and poor livestock health. The resource concerns to be addressed are Inadequate supply of water, grazing distribution, and degraded site conditions leading to poor animal health.

After Situation:

Practice typically installed for 30 animal units and consists of installing a jet or submersible pump, pressure tank, and appurtenances for a watering system. A 5' x 4' x 5' (100 cu ft) prefabricated concrete above ground pump house is installed above ground on a 8' x 8' x 1' gravel pad. An above ground pump house is utilized where burying is not feasible in a cost effective manner due to shallow soils. Conservation benefits of the installation is proper grazing distribution, which will allow a degraded site to be restored. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Associated practices: 528 Prescribed Grazing, 516 Pipeline, 614 Watering Facility, 642 Water Well

Scenario Feature Measure: per pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $2,713.44 **Scenario Cost/Unit:** $2,713.44

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	7	$145.67
Materials						
Pump House, Above Ground	2470	Above ground prefabricated pump house. Includes material and shipping only.	Each	$735.00	1	$735.00
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	2.4	$69.62
Pump, ≤ 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will	Each	$530.75	1	$530.75
Pressure Tank, 80 gallon	1039	Pressure Tank, 80 gallon. Includes materials and shipping only.	Each	$633.19	1	$633.19
Pump, ≤ 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and moto	Horsepower	$399.47	1.5	$599.21

Practice: 533 - Pumping Plant

Scenario: #15 - Livestock Water, Deep Well Pump (> 25 ft deep) with Buried Pump House

Scenario Description:

The scenario is for the installation of a pump and pressure tank in a deep well (> 25 feet) for supplying water to livestock. Payment includes pump, controls, pressure tank and installation. Payment also includes a buried pump house for situations where there is not an existing sheltered location for the pump to be installed.

Associated practices: 528 Prescribed Grazing, 516 Pipeline, 614 Watering Facility, 642 Water Well

Before Situation:

Practice to be installed on grazing land. Current conditions include inadequate water supply, poor water quality, degraded site condtions leading to erosion concerns, poor grazing distribution, and poor livestock health. The resource concerns to be addressed are Inadequate supply of water, grazing distribution, and degraded site conditions leading to poor animal health.

After Situation:

Practice typically installed for 30 animal units and consists of installing a jet or submersible pump, pressure tank, and appurtenances for a watering system. A 160 cu ft concrete well house is buried. A buried pump house is utilized where the ground is such that burying is not difficult and the climate conditions warrant burying for improved protection. Conservation benefits of the installation is proper grazing distribution, which will allow a degraded site to be restored. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Associated practices: 528 Prescribed Grazing, 516 Pipeline, 614 Watering Facility, 642 Water Well

Scenario Feature Measure: per pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $4,305.98 **Scenario Cost/Unit:** $4,305.98

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$111.14	3	$333.42
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	3	$88.92
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	7	$145.67
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	$20.00	1	$20.00
Pump, ≤ 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will	Each	$530.75	1	$530.75
Pump, ≤ 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and moto	Horsepower	$399.47	1.5	$599.21
Pressure Tank, 80 gallon	1039	Pressure Tank, 80 gallon. Includes materials and shipping only.	Each	$633.19	1	$633.19
Pumping Plant Pit, Concrete, 1200 Gallon	1922	Precast concrete septic tank structure, 1200 gal capacity, with access port and ladder. Materials only.	Each	$1,705.67	1	$1,705.67
Mobilization						

Mobilization

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

Practice: 533 - Pumping Plant

Scenario: #16 - Pump with Sump

Scenario Description:

The scenario is for the installation of a pump, pressure tank, and sump that supplies a dependable water supply to livestock from a pond, stream, or spring development.

Before Situation:

Practice to be installed on grazing land. Current conditions include inadequate water supply, poor water quality, degraded site condtions leading to erosion concerns, poor grazing distribution, and poor livestock health. The resource concerns to be addressed are Inadequate supply of water, grazing distribution, and degraded site conditions leading to poor animal health.

After Situation:

Practice typically installed for 30 animal units and consists of installing a pump, pressure tank, sump, and appurtenances for a watering system from a pond or stream or spring development. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Associated Practices: 528 Prescribed Grazing, 516 Pipeline, 614 Watering Facility, 642 Water Well

Scenario Feature Measure: per pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $3,963.31 **Scenario Cost/Unit:** $3,963.31

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	5	$272.85
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	3	$62.43
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	5	$119.30
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	10	$290.10
Pump, ≤ 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will	Each	$530.75	1	$530.75
Pump, ≤ 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and moto	Horsepower	$399.47	0.25	$99.87
Pressure Tank, 80 gallon	1039	Pressure Tank, 80 gallon. Includes materials and shipping only.	Each	$633.19	1	$633.19
Pumping Plant Pit, Concrete, 1200 Gallon	1922	Precast concrete septic tank structure, 1200 gal capacity, with access port and ladder. Materials only.	Each	$1,705.67	1	$1,705.67
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 533 - Pumping Plant

Scenario: #17 - Milk Transfer Pump

Scenario Description:

The typical scenario is for the installation of a 1 HP motor and transfer pump with appurtances, used in a dairy milking system to transfer milk from the milk receiver to the bulk tank. The motor will be used in conjunction with a VSD. This practice is to be used exclusively for implementing recommendations from on-farm energy audits. Payment includes pump, controlls and labor to install.

Before Situation:

The system is inefficient when a motor operates at constant speed to satisfy a load which varies as to flow rate and/or pressure requirements.

After Situation:

An on-farm energy audit has determined that energy use can be reduced through use of a more efficient motor and pump combination. A VSD will be used with the motor/pump combination so that the motor speed can be adjusted to reduce power requirements and better match varied flow or pressure requirements. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Associated Practice: 374 Farmstead Energy Improvement

Scenario Feature Measure: per pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $571.08 **Scenario Cost/Unit:** $571.08

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials						
Pump, Transfer, 1 HP, Pump and Motor	2472	Transfer pump with a 1 horsepower, 3 phase motor. Includes materials, labor, and controls.	Each	$571.08	1	$571.08

Practice: 533 - Pumping Plant

Scenario: #18 - Vacuum Pump

Scenario Description:

The typical scenario is for the installation of a 10 HP motor and vacuum pump with appurtances, used in a dairy milking system to transfer the milk from the animal to the milk receiver. The motor will be used in conjunction with a VSD. This practice is to be used exclusively for implementing recommendations from on-farm energy audits. Payment includes pump, controlls and labor to install.

Before Situation:

The system is inefficient when a motor operates at constant speed to satisfy a load which varies as to flow rate and/or pressure requirements.

After Situation:

An on-farm energy audit has determined that energy use can be reduced through use of a more efficient motor and pump combination. A VSD will be used with the motor/pump combination so that the motor speed can be adjusted to reduce power requirements and better match varied flow or pressure requirements. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Associated Practice: 374 Farmstead Energy Improvement

Scenario Feature Measure: per pump

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $5,228.31 **Scenario Cost/Unit:** $5,228.31

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials						
Pump, Vacuum, 10 HP, Pump and Motor	2473	Vacuum pump including a 10 horsepower, 3 phase motor. Includes materials, labor, and controls.	Each	$5,228.31	1	$5,228.31

Practice: 554 - Drainage Water Management

Scenario: #1 - >10 Acres per Structure

Scenario Description:

This scenario describes the management of a drainage water system in a row crop field with subsurface drainage system already installed or planned to be installed with control structures, or a surface water management system with berms or levees around the field and control structures. Drainage conditions consist of gentle slopes with few variations in drainage characteristics and surface slopes. Subsurface drainage pattern consists of fewer secondary main lines. Implementation of DWM results in improved water quality by reducing nutrient losses from the soil through ground or surface water outside of the growing season. Management of the water table results in more ground water available for crops during the growing season while lowering the water table prior to crop planting and crop harvest to avoid causing compaction.

Before Situation:

In this scenario the gently sloping cropland is drained with pattern subsurface drainage (typically perforated corrugated plastic tubing). The purpose of the drainage system is to decrease soil moisture conditions during planting and harvesting of crop. Subsurface drainage is not restricted at anytime during the year resulting in a permanently lowered water table which is typically 3-4 feet below the surface and well below the crop root zone. Excess ground water is discharged directly to adjacent receiving streams. Excess subsurface drainage contributes to degraded water quality from excessive nutrient discharge; less vigorous crop growth from lowered water table.

After Situation:

Typical systems consist of a 75 acre field with existing drainage tile lines and 5 installed water control structures. The operator walks the field in order to adjust water control structures (riser boards). While on site the date and adjustment information is recorded/logged. The number of yearly adjustments is based on 6 trips to a field 5 miles from headquarters. The field time to make and record each adjustment is 0.5 hours per structure (including travel time). The typical field will contain 5 water control structures.Scenario includes the cost of participant attending a workshop to gain knowledge about implementing the practice.
Resource Concern: Water Quality - Excess Nutrients in surface and ground waters. Insufficient Water - Insufficient Moisture Management.
Associated Practices: 329:Residue Management - No Till/Strip Till; 606-Subsurface Drain; 607-Surface Drain, Field Ditch; 608-Surface Drain, Main or Lateral; 587-Structure for Water Control; 590-Nutrient Management.

Scenario Feature Measure: Acres of Managed Drainage

Scenario Unit: Acre

Scenario Typical Size: 75

Scenario Cost: $467.85 **Scenario Cost/Unit:** $6.24

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	15	$467.85

Practice: 554 - Drainage Water Management

Scenario: #3 - <=10 Acres per Structure

Scenario Description:

This scenario describes the management of a drainage water system in a row crop field with subsurface drainage system already installed or planned to be installed with control structures, or a surface water management system with berms or levees around the field and control structures. Drainage conditions consist of gentle to moderately slopes with many variations in drainage characteristics and surface slopes. Subsurface drainage pattern consists of many secondary main lines due to changes in drainage patterns. Implementation of DWM results in improved water quality by reducing nutrient losses from the soil through ground or surface water outside of the growing season. Management of the water table results in more ground water available for crops during the growing season while lowering the water table prior to crop planting and crop harvest to avoid causing compaction.

Before Situation:

In this scenario the gently to moderately sloping cropland is drained with pattern subsurface drainage (typically perforated corrugated plastic tubing). The purpose of the drainage system is to decrease soil moisture conditions during planting and harvesting of crop. Subsurface drainage is not restricted at anytime during the year resulting in a permanently lowered water table which is typically 3-4 feet below the surface and well below the crop root zone. Excess ground water is discharged directly to adjacent receiving streams. Excess subsurface drainage contributes to degraded water quality from excessive nutrient discharge; less vigorous crop growth from lowered water table.

After Situation:

Typical systems consist of a 50 acre field with existing drainage tile lines and 5 installed water control structures. The operator walks the field in order to adjust water control structures (riser boards). While on site the date and adjustment information is recorded/logged. The number of yearly adjustments is based on 6 trips to a field 5 miles from headquarters. The field time to make and record each adjustment is 0.5 hours per structure (including travel time). The typical field will contain 5 water control structures.
Resource Concern: Water Quality - Excess Nutrients in surface and ground waters. Insufficient Water - Insufficient Moisture Management.
Associated Practices: 329:Residue Management - No Till/Strip Till; 606-Subsurface Drain; 607-Surface Drain, Field Ditch; 608-Surface Drain, Main or Lateral; 587-Structure for Water Control; 590-Nutrient Management.

Scenario Feature Measure: Acres of Managed Drainage

Scenario Unit: Acre

Scenario Typical Size: 50

Scenario Cost: $467.85 **Scenario Cost/Unit:** $9.36

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	15	$467.85

Practice: 558 - Roof Runoff Structure

Scenario: #1 - RoofGutter,Small

Scenario Description:

A gutter-downspout system for the side of a 30'x70' livestock confinement building, to exclude clean water from the loafing area adjacent to the building. Roof area served by the 70' long gutter is 1,050 square feet. The gutter is a 5" K-type, with two 12' downspouts to convey the roof runoff to ground level. Underground outlets (CPS 620) are then utilized to safely outlet the water from the downspouts. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns.

Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Underground Outlet (620), and/or Diversion (362) to capture flow from downspouts and route away from contaminated areas as needed.

Before Situation:

Runoff water from the roof of the livestock confinement building falls onto the loafing area. The addition of extra water to the contaminated surface creates additional contaminated wastewater which runs off into nearby surface waters, increasing the magnitude of the existing water quality resource concern and increasing the volume of material that would need to be collected, stored, treated and land applied in a waste management system.

After Situation:

A gutter-downspout system has been installed on the side of the building adjacent to the loafing area, routing the clean water away from the contaminated surface, and reducing the volume of contaminated runoff from the loafing area.

Scenario Feature Measure: Linear Length of Roof to be Drained

Scenario Unit: Linear Foot

Scenario Typical Size: 70

Scenario Cost: $649.67 **Scenario Cost/Unit:** $9.28

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	#######	$97.11
Materials						
Gutter, Aluminum, Small	1689	Aluminum gutter (4" to 6") in width with hangers. Materials only.	Foot	$2.91	70	$203.70
Downspout, Aluminum, Small	1700	Aluminum downspout (3" to 5") in width with hangers. Materials only.	Foot	$3.18	24	$76.32
Pipe, PVC, 6", SCH 40	980	Materials: - 6" - PVC - SCH 40 - ASTM D1785	Foot	$6.56	16	$104.96
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	$167.58	1	$167.58

Practice: 558 - Roof Runoff Structure

Scenario: #2 - RoofGutter,Med

Scenario Description:

A gutter-downspout system for the side of a 70'x140' livestock confinement building, to exclude clean water from the loafing area adjacent to the building. Roof area served by the 140' long gutter is 4,900 square feet. The gutter is a 7" K-type, with two 12' downspouts to convey the roof runoff to ground level. Underground outlets (CPS 620) are then utilized to safely outlet the water from the downspouts. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns.

Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Underground Outlet (620), and/or Diversion (362) to capture flow from downspouts and route away from contaminated areas as needed.

Before Situation:

Runoff water from the roof of the livestock confinement building falls onto the loafing area. The addition of extra water to the contaminated surface creates additional contaminated wastewater which runs off into nearby surface waters, increasing the magnitude of the existing water quality resource concern and increasing the volume of material that would need to be collected, stored, treated and land applied in a waste management system.

After Situation:

A gutter-downspout system has been installed on the side of the building adjacent to the loafing area, routing the clean water away from the contaminated surface, and reducing the volume of contaminated runoff from the loafing area.

Scenario Feature Measure: Linear Length of Roof to be Drained

Scenario Unit: Linear Foot

Scenario Typical Size: 140

Scenario Cost: $2,486.89 **Scenario Cost/Unit:** $17.76

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	7	$145.67
Materials						
Pipe, PVC, 8", SCH 40	981	Materials: - 8" - PVC - SCH 40 - ASTM D1785	Foot	$9.63	16	$154.08
Gutter, Aluminum, Medium	1690	Aluminum gutter (7" to 9") in width with hangers. Materials only.	Foot	$9.13	140	$1,278.20
Downspout, Aluminum, Medium	1701	Aluminum downspout (6" to 8") in width with hangers. Materials only.	Foot	$30.89	24	$741.36
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	$167.58	1	$167.58

Practice: 558 - Roof Runoff Structure

Scenario: #3 - RoofGutter,Large

Scenario Description:

A gutter-downspout system for the side of a 160'x220' livestock confinement building, to exclude clean water from the loafing area adjacent to the building. Roof area served by the 220' long gutter is 17,600 square feet. The gutter is 11", with two 12' downspouts to convey the roof runoff to ground level. Underground outlets (CPS 620) are then utilized to safely outlet the water from the downspouts. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns.

Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Underground Outlet (620), and/or Diversion (362) to capture flow from downspouts and route away from contaminated areas as needed.

Before Situation:

Runoff water from the roof of the livestock confinement building falls onto the loafing area. The addition of extra water to the contaminated surface creates additional contaminated wastewater which runs off into nearby surface waters, increasing the magnitude of the existing water quality resource concern and increasing the volume of material that would need to be collected, stored, treated and land applied in a waste management system.

After Situation:

A gutter-downspout system has been installed on the side of the building adjacent to the loafing area, routing the clean water away from the contaminated surface, and reducing the volume of contaminated runoff from the loafing area.

Scenario Feature Measure: Linear Length of Roof to be Drained

Scenario Unit: Linear Foot

Scenario Typical Size: 220

Scenario Cost: $6,571.93 **Scenario Cost/Unit:** $29.87

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	11	$228.91
Materials						
Gutter, Aluminum, Large	1691	Aluminum gutter (10" to 12") in width with hangers. Materials only.	Foot	$24.00	220	$5,280.00
Downspout, Aluminum, Medium	1701	Aluminum downspout (6" to 8") in width with hangers. Materials only.	Foot	$30.89	24	$741.36
Pipe, PVC, 8", SCH 40	981	Materials: - 8" - PVC - SCH 40 - ASTM D1785	Foot	$9.63	16	$154.08
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	$167.58	1	$167.58

Practice: 558 - Roof Runoff Structure

Scenario: #4 - RockTrenchDrain

Scenario Description:

An aggregate-filled infiltration trench lined with geotextile, 3 ft wide by 2 ft deep, is placed on each side of a 40' x 100' hoop structure storing feedstock at the headquarters site of a confined livestock operation, to exclude roof runoff from contaminated lot surfaces. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns. This scenario is to be used where environmental/design considerations, for example – snow loads, or a building without proper structural support needed for gutters- dictate the use of the trench drain. May be used to prevent roof runoff from causing erosion or ponding of water adjacent to a seasonal high tunnel, benefitting water quality, water quantity, and soil erosion. In situations where the roof runoff will not properly infiltrate the soil, a subsurface drain system will be installed using 606 - Subsurface Drain.

Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Seasonal High Tunnel (798), Subsurface Drain (606), and Diversion (362).

Before Situation:

Runoff water from the roof of the hoop structure enters the lot. The addition of extra water to the contaminated surface creates additional contaminated wastewater which runs off into nearby surface waters, increasing the magnitude of the existing water quality resource concern and increasing the volume of material that would need to be collected, stored, treated and land applied in a waste management system.

After Situation:

An aggregate-filled infiltration trench lined with geotextile is placed on each side of the hoop structure. Runoff from the roof of the structure enters the infiltration trench and drains off site to a stable outlet through a subsurface drain. The volume of contaminated water at the confinement site is reduced.

Scenario Feature Measure: Linear Length of Roof to be Drained

Scenario Unit: Linear Feet

Scenario Typical Size: 200

Scenario Cost: $1,950.32 **Scenario Cost/Unit:** $9.75

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	158	$376.04
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$2.25	45	$101.25
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	45	$1,305.45
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	$167.58	1	$167.58

Practice: 560 - Access Road

Scenario: #3 - New gravel road, 8in x 10ft, wet level terrain

Scenario Description:

Newly Constructed 10 foot wide gravel road with min. 8 inch thick compacted gravel surface in relatively level ground in wet areas. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise which requires, but does not have, a fixed travel way for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively wet and swampy but level terrain lands.

After Situation:

The single lane road will be graveled to a width of 10 feet, plus 2 foot shoulders for a total width of 14 feet wide. Gravel will be a minumum of 8 inches, underlain with geotextile fabric. It is mostly in embankment less than 3 feet in height, (average 1.5 ft) typical side slopes 2:1. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

Scenario Feature Measure: Length of Roadway

Scenario Unit: Foot

Scenario Typical Size: 1,000

Scenario Cost: $13,049.05 **Scenario Cost/Unit:** $13.05

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
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	$19.69	0.14	$2.76
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$4.19	940	$3,938.60
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	1333	$3,172.54
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	10	$311.90
Materials						
Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	0.14	$6.52
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	$20.00	260	$5,200.00
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	$167.58	1	$167.58
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 560 - Access Road

Scenario: #4 - New gravel road, 8in x 12ft, wet level terrain

Scenario Description:

Newly Constructed 12 foot wide gravel road with min. 8 inch thick compacted gravel surface in relatively level ground in wet areas. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise which requires, but does not have, a fixed travel way for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively wet and swampy but level terrain lands.

After Situation:

The single lane road will be graveled to a width of 12 feet, plus 2 foot shoulders for a total width of 16 feet wide. Gravel will be a minumum of 8 inches, underlain with geotextile fabric. It is mostly in embankment less than 3 feet in height, (average 1.5 ft) typical side slopes 2:1. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

Scenario Feature Measure: Length of Roadway

Scenario Unit: Foot

Scenario Typical Size: 1,000

Scenario Cost: $15,204.97 **Scenario Cost/Unit:** $15.20

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$4.19	1060	$4,441.40
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	1556	$3,703.28
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.69	0.14	$2.76
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	12	$374.28
Materials						
Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	0.14	$6.52
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	$20.00	313	$6,260.00
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	$167.58	1	$167.58
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 560 - Access Road

Scenario: #5 - New gravel road, 8in x 16ft, wet level terrain

Scenario Description:

Newly Constructed 16 foot wide gravel road with min. 8 inch thick compacted gravel surface in relatively level ground in wet areas. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise which requires, but does not have, a fixed travel way for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively wet and swampy but level terrain lands.

After Situation:

The road will be graveled to a width of 16 feet , plus 2 foot shoulders for a total width of 20 feet wide. Gravel will be a minumum of 8 inches, underlain with geotextile fabric. It is mostly in embankment less than 3 feet in height, (average 1.5 ft) typical side slopes 2:1. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

Scenario Feature Measure: Length of Roadway

Scenario Unit: Foot

Scenario Typical Size: 1,000

Scenario Cost: $20,314.07 **Scenario Cost/Unit:** $20.31

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
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	$19.69	0.14	$2.76
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$4.19	1280	$5,363.20
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	2389	$5,685.82
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	16	$499.04
Materials						
Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	0.14	$6.52
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	$20.00	417	$8,340.00
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	$167.58	1	$167.58
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 561 - Heavy Use Area Protection

Scenario: #1 - Concrete HUA

Scenario Description:

Installation of a concrete heavy use pad to provide a stable, non-eroding surface for areas frequently used by livestock, people or vehicles.

Before Situation:

A 30 head cow/calf operation with a frequently used area that is unstable with an eroding surface. The area lacks vegetation and has severe compaction concerns as well as deep mud. Concentration of nutrients cannot be spread on adjacent fields due to the unstable surface. Livestock health is compromised as additional energy is being used to travel through mud. A need exists to improve water quality, air quality, livestock health, as well as reduce soil erosion and compaction.

After Situation:

The stabilization of areas frequently and intensively used by livestock by installing a concrete surface to reduce soil erosion, improve water quality, air quality, and livestock health. Typical size is 3,900 square feet. The base consists of 4" of gravel. The concrete is a reinforced slab on grade with a thickness of 5". Payment incorporates site preparation through grading and shaping, concrete pad and gravel. Cost data is applicable to organic and conventional agricultural production systems.

Scenario Feature Measure: Area of reinforced concrete

Scenario Unit: Square Foot

Scenario Typical Size: 3,900

Scenario Cost: $9,656.77 **Scenario Cost/Unit:** $2.48

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	$128.74	61	$7,853.14
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$2.25	72	$162.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	48	$1,392.48
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 561 - Heavy Use Area Protection

Scenario: #4 - Bituminous Concrete Pavement

Scenario Description:

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with bituminous concrete pavement on aggregate gravel foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.

Before Situation:

This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality
degradation.

After Situation:

The stabilized area is surfaced with approximately 630 square feet of bituminous concrete pavement on 8 cubic yards of aggregate gravel material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Scenario Feature Measure: Area of Bituminous Pavement

Scenario Unit: Square Foot

Scenario Typical Size: 630

Scenario Cost: $1,882.53 **Scenario Cost/Unit:** $2.99

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$2.25	4	$9.00
Materials						
Asphalt, pavement	1867	Bituminous Concrete,includes materials, equipment and labor for 4" layer, base not included.	Square Foot	$2.21	630	$1,392.30
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	8	$232.08
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 561 - Heavy Use Area Protection

Scenario: #7 - Gravel with Geotextile, Thick

Scenario Description:

Installation of a gravel heavy use pad to provide a stable, non-eroding surface for areas frequently used by livestock, people or vehicles.

Before Situation:

A 30 head cow/calf operation with a frequently used area that is unstable with an eroding surface. The area lacks vegetation and has severe compaction concerns as well as deep mud. Concentration of nutrients cannot be spread on adjacent fields due to the unstable surface. Livestock health is compromised as additional energy is being used to travel through mud. A need exists to improve water quality, air quality, livestock health, as well as reduce soil erosion and compaction.

After Situation:

The stabilization of areas frequently and intensively used by livestock by installing a gravel surface to reduce soil erosion, improve water quality, air quality, and livestock health. Typical size is 3,900 square feet. Gravel, 8" deep, is placed over light geotextile fabric and surfaced with a 3" layer of fines. Payment incorporates site preparation through grading and shaping, gravel and layer of fines and light geotextile fabric. Cost data is applicable to organic and conventional agricultural production systems.

Scenario Feature Measure: Area of gravel

Scenario Unit: Square Foot

Scenario Typical Size: 3,900

Scenario Cost: $6,042.70 **Scenario Cost/Unit:** $1.55

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	433	$1,030.54
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$121.14	6	$726.84
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	6	$177.84
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	133	$3,858.33
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 561 - Heavy Use Area Protection

Scenario: #8 - Gravel without Geotextile, Thick

Scenario Description:

Installation of a gravel heavy use pad to provide a stable, non-eroding surface for areas frequently used by livestock, people or vehicles.

Before Situation:

A 30 head cow/calf operation with a frequently used area that is unstable with an eroding surface. The area lacks vegetation and has severe compaction concerns as well as deep mud. Concentration of nutrients cannot be spread on adjacent fields due to the unstable surface. Livestock health is compromised as additional energy is being used to travel through mud. A need exists to improve water quality, air quality, livestock health, as well as reduce soil erosion and compaction.

After Situation:

The stabilization of areas frequently and intensively used by livestock by installing a gravel surface to reduce soil erosion, improve water quality, air quality, and livestock health. Typical size is 3,900 square feet. Gravel, 8" deep,is surfaced with a 3" layer of fines. Payment incorporates site preparation through grading and shaping, gravel and layer of fines. Cost data is applicable to organic and conventional agricultural production systems.

Scenario Feature Measure: Area of gravel

Scenario Unit: Square Foot

Scenario Typical Size: 3,900

Scenario Cost: $5,012.16 **Scenario Cost/Unit:** $1.29

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$121.14	6	$726.84
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	6	$177.84
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	133	$3,858.33
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 561 - Heavy Use Area Protection

Scenario: #9 - Gravel with Geotextile, Regular Thickness

Scenario Description:

Installation of a gravel heavy use pad to provide a stable, non-eroding surface for areas frequently used by livestock, people or vehicles.

Before Situation:

A 30 head cow/calf operation with a frequently used area that is unstable with an eroding surface. The area lacks vegetation and has severe compaction concerns as well as deep mud. Concentration of nutrients cannot be spread on adjacent fields due to the unstable surface. Livestock health is compromised as additional energy is being used to travel through mud. A need exists to improve water quality, air quality, livestock health, as well as reduce soil erosion and compaction.

After Situation:

The stabilization of areas frequently and intensively used by livestock by installing a gravel surface to reduce soil erosion, improve water quality, air quality, and livestock health. Typical size is 3,900 square feet. Gravel, 5" deep, is placed over light geotextile fabric and surfaced with a 2" layer of fines. Payment incorporates site preparation through grading and shaping, gravel and layer of fines and light geotextile fabric. Cost data is applicable to organic and conventional agricultural production systems.

Scenario Feature Measure: Area of gravel

Scenario Unit: Square Foot

Scenario Typical Size: 3,900

Scenario Cost: $4,650.22 **Scenario Cost/Unit:** $1.19

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	433	$1,030.54
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$121.14	6	$726.84
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	6	$177.84
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	85	$2,465.85
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 561 - Heavy Use Area Protection

Scenario: #10 - Gravel without Geotextile, Regular Thickness

Scenario Description:

Installation of a gravel heavy use pad to provide a stable, non-eroding surface for areas frequently used by livestock, people or vehicles.

Before Situation:

A 30 head cow/calf operation with a frequently used area that is unstable with an eroding surface. The area lacks vegetation and has severe compaction concerns as well as deep mud. Concentration of nutrients cannot be spread on adjacent fields due to the unstable surface. Livestock health is compromised as additional energy is being used to travel through mud. A need exists to improve water quality, air quality, livestock health, as well as reduce soil erosion and compaction.

After Situation:

The stabilization of areas frequently and intensively used by livestock by installing a gravel surface to reduce soil erosion, improve water quality, air quality, and livestock health. Typical size is 3,900 square feet. Gravel, 5" deep,is surfaced with a 2" layer of fines. Payment incorporates site preparation through grading and shaping, gravel and layer of fines. Cost data is applicable to organic and conventional agricultural production systems.

Scenario Feature Measure: Area of gravel

Scenario Unit: Square Foot

Scenario Typical Size: 3,900

Scenario Cost: $3,619.68 **Scenario Cost/Unit:** $0.93

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$121.14	6	$726.84
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	6	$177.84
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	85	$2,465.85
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 574 - Spring Development

Scenario: #1 - Collection Structure

Scenario Description:

Develop a water source from a natural spring or seep to provide water for livestock and/or wildlife needs. This scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside) and installing a water collection structure. Payment includes excavation and labor to expose the spring, concrete for collection box, lid and gravel backfill.

Resource Concern: Livestock production limitation - Inadequate livestock water.

Before Situation:

Livestock operation with inadequate fresh water for livestock and an on-site undeveloped spring/seep.

After Situation:

Spring development system provides adequate water for the intended use. The system typically runs all year long in most zones. Site is excavated with a backhoe to expose the seep, a concrete collection box (3'x3'x4') is installed and gravel is backfilled between the spring source and collection box.

Associated Practices: 516-Livestock Pipeline; 614-Watering Facility; 533 Pumping Plant

Scenario Feature Measure: Number of Developments

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $1,247.44 **Scenario Cost/Unit:** $1,247.44

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
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	$406.76	0.75	$305.07
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	4	$218.28
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	4	$95.44
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	8	$166.48
Materials						
Spring Collection Box Cover, steel, 4' diameter	1281	4' diameter x 1/4" thick Steel lid with handle for spring collection box. Materials and fabrication.	Each	$184.01	1	$184.01
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	1	$29.01
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 574 - Spring Development

Scenario: #2 - Horizontal Collection Pipe

Scenario Description:

Develop a water source from a natural spring or seep to provide water for livestock and/or wildlife needs. This scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside) and installing a horizontal water collection system. The collection system is commonly composed of perforated drainage pipe placed in an excavated collection trench that runs across the slope, and is piped directly to watering facilities (implemented through associated practice 614).

Resource Concern: Livestock production limitation - Inadequate livestock water.

Before Situation:

Livestock operation with inadequate fresh water for livestock and an on-site undeveloped spring/seep.

After Situation:

Spring development system provides adequate water for the intended use. The system typically runs all year long in most zones. Horizontal water collection system is a 50 ft long, 4 inch diameter HDPE perforated pipe enclosed in a sand/gravel envelope overlaid by 2 ft wide filter fabric (50 ft long).

Associated Practices: 516-Livestock Pipeline; 614-Watering Facility

Scenario Feature Measure: Number of Development

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $950.95 **Scenario Cost/Unit:** $950.95

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	11	$26.18
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	4	$218.28
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	8	$166.48
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	4	$95.44
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$28.63	3	$85.89
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	3	$87.03
Pipe, HDPE, 4", PCPT, Single Wall	1270	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only.	Foot	$0.45	50	$22.50
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 574 - Spring Development

Scenario: #3 - Horizontal Pipe with Collection Box

Scenario Description:

Develop a water source from a natural spring or seep to provide water for livestock and/or wildlife needs. This scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside) and installing a horizontal water collection system and a water storage structure. The collection system is commonly composed of perforated 4 inch diameter drainage pipe placed in an excavated collection trench that runs across the slope into the collection box.

Resource Concern: Livestock production limitation - Inadequate livestock water.

Before Situation:

Livestock operation with inadequate fresh water for livestock and an on-site undeveloped spring/seep.

After Situation:

Spring development system provides adequate water for the intended use. The system typically runs all year long in most zones. Water is collected in a spring box (48 inch diameter x 6 ft long CMP). Horizontal water collection system is a 50 ft long, 4 inch diameter HDPE perforated pipe enclosed in a sand/gravel envelope overlaid by 2 ft wide filter fabric (50 ft long).

Associated Practices: 516-Livestock Pipeline; 614-Watering Facility; 533 Pumping Plant

Scenario Feature Measure: Number of Developments

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $2,288.78 **Scenario Cost/Unit:** $2,288.78

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	8	$436.56
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	11	$26.18
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	$406.76	1	$406.76
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	16	$332.96
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	8	$190.88
Materials						
Pipe, PVC, 4", SCH 40	978	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	$3.98	20	$79.60
Spring Collection Box Cover, steel, 4' diameter	1281	4' diameter x 1/4" thick Steel lid with handle for spring collection box. Materials and fabrication.	Each	$184.01	1	$184.01
Pipe, HDPE, 4", PCPT, Single Wall	1270	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only.	Foot	$0.45	50	$22.50
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	3	$87.03
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$28.63	3	$85.89
Pipe, CMP, 48", 14 Gauge	1280	48" Corrugated Metal Pipe, Galvanized, Uncoated, 14 gage. Material cost only.	Foot	$31.21	6	$187.26

Mobilization

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

Practice: 575 - Trails and Walkways

Scenario: #4 - Trail or Walkway, Rock/Gravel on Geotextile

Scenario Description:

Layout and construct a trail or walkway with rock and or gravel on a geotextile fabric foundation to facilitate the movement of animals, people, or off-road vehicles to provide or improve access to forage, water, working/handling facilities, and/or shelter, improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites, pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations, provide trails for recreational activities or access to recreation sites and address the resource concerns of soil erosion and water quality degradation. Includes excavation, shaping, grading, rock and or gravel, geotextile, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

This practice applies on all lands where management of animal or human movement is needed to address soil erosion, water quality, and livestock production limitation resource concerns. This practice also applies to trails or walkways constructed for use by off-road vehicles, such as All-Terrain Vehicles or snowmobiles, which are designed for off-road use.

After Situation:

The typical trail or walkway is an 8 foot wide by 600 foot long lane with a surface treatment of rock and or gravel on a geotextile fabric foundation. The trail or walkway is constructed of approved materials, with a life expectancy that meets or exceeds the planned useful life of the installation. All materials, equipment, and labor to install the trail or walkway and surfacing is included. Vegetation of adjacent disturbed areas is also included. The resource concerns of soil erosion, water quality, and livestock production limitations have been addressed. Other associated practices include Stream Crossing (578), Diversion (362), and Fence (382). Use Access Road (560) if the movement of vehicles or equipment is needed for purposes other than management and maintenance of the trail or walkway.

Scenario Feature Measure: Length of trail or walkway

Scenario Unit: Linear Foot

Scenario Typical Size: 600

Scenario Cost: $4,902.91 **Scenario Cost/Unit:** $8.17

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$2.25	30	$67.50
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	534	$1,270.92
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$36.22	2	$72.44
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$65.49	4	$261.96
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	4	$124.76
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	$20.81	6	$124.86
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	4	$118.56
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	90	$2,610.90
Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	0.04	$1.86

Mobilization

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

Practice: 578 - Stream Crossing

Scenario: #2 - Rip Rap Crossing

Scenario Description:

A stabilized area or structure constructed across a stream to provide a travel way for people, livestock, equipment, or vehicles. This practice applies to all land uses where an intermittent or perennial watercourse exists and a ford crossing is desired for livestock, people, and /or equipment. Stream bed in the channel reach containing the crossing must be vertically stable. Scenario is for stabilizing the bottom and slope of a stream channel using Rip Rap, gravel and geotextile. This scenario includes site preparation, dewatering, acquiring and installing rip rap and gravel on channel bottom and approaches. Scenario is based on a 20' wide x 50' long crossing. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic.

Before Situation:

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation:

Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross.

Associated practices: (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

Scenario Feature Measure: Crossing dimensions

Scenario Unit: Square Foot

Scenario Typical Size: 1,000

Scenario Cost: $3,171.38 **Scenario Cost/Unit:** $3.17

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, side cast, large equipment	1227	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$1.76	37	$65.12
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	2	$59.28
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$60.72	37	$2,246.64
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	19	$551.19
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 578 - Stream Crossing

Scenario: #6 - Culvert Installation

Scenario Description:

Install a new culvert. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and building headwalls. If a different travel surface is needed, refer to another appropriate standard for the surfacing. 30 inch Culvert installation with <75 cy of fill needed and < 2 yds rock riprap for headwalls. Pipe is 40 feet long.Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows.

Before Situation:

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation:

Access road and waterflow are able to cross each other in a stable manner.Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross.

Associated practices: (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

Scenario Feature Measure: Culvert

Scenario Unit: Diameter Inch Foot

Scenario Typical Size: 1,200

Scenario Cost: $4,321.82 **Scenario Cost/Unit:** $3.60

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$5.51	3	$16.53
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$111.14	10	$1,111.40
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	10	$296.40
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	50	$1,450.50
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$60.72	2	$121.44
Pipe, HDPE, CPT, Double Wall, Soil Tight, 30"	1247	Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	$26.91	40	$1,076.40
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 580 - Streambank and Shoreline Protection

Scenario: #1 - Bank Shaping

Scenario Description:

Protection of streambanks consisting of shaping banks to a stable slope and conventional plantings of vegetation to stabilize and protect against scour and erosion.
The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank; a 6-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.46 acres) is used for estimation purposes.
Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.
Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; 570-Stormwater Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has marginally degraded streambanks that are unstable and show signs of active erosion.
Soil Erosion: The streambank is unstable.
Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.
Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.
Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. Critical Area Planting (342) is included for establishment of vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484).
For Soil Erosion: The streambank is stable.
For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.
For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.
For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Scenario Feature Measure: Linear Feet of Streambank/Shoreline Protected

Scenario Unit: Linear Foot

Scenario Typical Size: 1,000

Scenario Cost: $9,717.30 **Scenario Cost/Unit:** $9.72

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$2.25	2500	$5,625.00
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$65.49	16	$1,047.84
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	16	$381.76
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	56	$2,164.40
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	2	$498.30

Practice: 580 - Streambank and Shoreline Protection

Scenario: #2 - Bioengineered

Scenario Description:

Protection of streambanks consisting of a bioengineered technique comprised of non-structural measures such as earth revetments and benches with vegetative measures to stabilize and protect the streambank against scour and erosion. Soil bioengineering is a system of living plant materials used as structural components. Adapted types of woody vegetation (shrubs and trees) are initially installed in specified configurations that offer immediate soil protection and reinforcement. In addition, soil bioengineering systems create resistance to sliding or shear displacement in a streambank as they develop roots or fibrous inclusions. Environmental benefits derived from woody vegetation include diverse and productive riparian habitats, shade, organic additions to the stream, cover for fish, and improvements in aesthetic value and water quality. Under certain conditions, soil bioengineering installations work well in conjunction with structures to provide more permanent protection and healthy function, enhance aesthetics, and create a more environmentally acceptable product. Soil bioengineering systems normally use unrooted plant parts in the form of cut branches and rooted plants. For streambanks, living systems include brushmattresses, live stakes, joint plantings, vegetated geogrids, branchpacking, and live fascines.

The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank and willow tree planting. A 6-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.46 acres) is used for estimation purposes.

Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.

Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; 570-Stormwater Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has moderately degraded streambanks that are unstable and show signs of active erosion.

Soil Erosion: The streambank is unstable.

Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.

Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.

Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. Critical Area Planting (342) is included for establishment of vegetation if needed. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484).

For Soil Erosion: The streambank is stable.

For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.

For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.

For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Scenario Feature Measure: Linear Feet of Streambank/Shoreline Protected

Scenario Unit: Linear Foot

Scenario Typical Size: 1,000

Scenario Cost: $20,197.10 **Scenario Cost/Unit:** $20.20

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$65.49	16	$1,047.84
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$2.25	2500	$5,625.00
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	75	$2,223.00

Labor

Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	80	$3,092.00
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	320	$6,659.20
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	16	$381.76

Materials

Tree, willow	1426	Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only.	Each	$0.67	1000	$670.00

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	2	$498.30

Practice: 580 - Streambank and Shoreline Protection

Scenario: #3 - Structural

Scenario Description:

Protection of streambanks using rock riprap to stabilize and protect banks of streams or excavated channels against scour and erosion. Additional structural measures may also include tree revetments; log, rootwad and boulder revetments; dormant post plantings; piling revetments with wire or geotextile fencing; piling revetments with slotted fencing; jacks or jack fields; rock riprap; stream jetties; stream barbs; and gabions.

The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, critical area vegetation, geotextile, and rock rip rap; a 10-foot high bank at 2(H):1(V) slope for 500 linear feet is used for estimation purposes. The rock will be 2' thick and 10' high. The bank above the riprap will be graded to a stable slope and revegetated.

Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.

Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; 570-Stormwater Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion.

Soil Erosion: The streambank is unstable.

Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.

Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.

Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.

For Soil Erosion: The streambank is stable.

For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.

For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.

For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Scenario Feature Measure: Cubic Yard of Riprap

Scenario Unit: Cubic Yard

Scenario Typical Size: 833

Scenario Cost: $40,159.96 **Scenario Cost/Unit:** $48.21

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.38	1222	$2,908.36
Hydraulic Excavator, 2 CY	932	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	$185.79	32	$5,945.28
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$23.86	32	$763.52
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	4	$154.60
Materials						
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$23.93	1250	$29,912.50

Mobilization

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

Practice: 580 - Streambank and Shoreline Protection

Scenario: #4 - Stream Barb/LPSTP-Longitudinal Peaked Stone Toe Protection-small Streams

Scenario Description:

Protection of streambanks using longitudinal peaked stone toe protection to stabilize and protect banks of streams or excavated channels against scour and erosion. Additional structural measures may also include tree revetments; log, rootwad and boulder revetments; dormant post plantings; piling revetments with wire or geotextile fencing; piling revetments with slotted fencing; jacks or jack fields; rock riprap; stream jetties; stream barbs; J-Hooks and gabions.

The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost includes rock rip rap and placement. A 4' high stone toe with 1.5:1 sideslopes, 275 linear feet in length is used for estimation purposes. The bank behind the riprap will not be modified. Stream with less than 100 sq miles drainage area.

Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.

Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; 570-Stormwater Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion.

Soil Erosion: The streambank is unstable.

Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.

Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.

Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.

For Soil Erosion: The streambank is stable.

For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.

For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.

For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Scenario Feature Measure: Linear foot of bank protected

Scenario Unit: Linear Foot

Scenario Typical Size: 275

Scenario Cost: $9,260.33 **Scenario Cost/Unit:** $33.67

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$111.14	8	$889.12
Excavation, common earth, wet, side cast, large equipment	1228	Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$4.10	24	$98.40
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	8	$309.20
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	8	$237.12
Materials						

Materials

Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$23.93	303	$7,250.79

Mobilization

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

Practice: 580 - Streambank and Shoreline Protection

Scenario: #5 - Stone Toe protection with vegetation

Scenario Description:

Protection of streambanks using riprap toe protection with grass vegetation on the upper portion of the bank to stabilize and protect banks of streams or excavated channels against scour and erosion. Additional structural measures may also include tree revetments; log, rootwad and boulder revetments; dormant post plantings; piling revetments with wire or geotextile fencing; piling revetments with slotted fencing; jacks or jack fields; rock riprap; stream jetties; stream barbs; and gabions.

The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost includes rock rip rap and bank shaping. Typical installation consists of 4 vertical feet of riprap toe protection on a 2:1 slope, 2' thick. 4 vertical feet of bank above the rock will be shaped to a 4:1 slope, seeded to cool season vegetation and covered with erosion control blanket.

Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.

Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; 570-Stormwater Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion.

Soil Erosion: The streambank is unstable.

Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.

Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.

Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.

For Soil Erosion: The streambank is stable.

For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.

For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.

For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Scenario Feature Measure: Linear Feet of Bank Protected

Scenario Unit: Foot

Scenario Typical Size: 250

Scenario Cost: $10,035.04 **Scenario Cost/Unit:** $40.14

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$111.14	8	$889.12
Excavation, common earth, wet, side cast, large equipment	1228	Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$4.10	560	$2,296.00
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	8	$237.12
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	4	$154.60
Materials						

Materials

Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$23.93	250	$5,982.50

Mobilization

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

Practice: 580 - Streambank and Shoreline Protection

Scenario: #6 - Stream Barb/Bendway Weir-large stream

Scenario Description:

Protection of streambanks using stream barbs to stabilize and protect banks of streams or excavated channels against scour and erosion. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost includes rock rip rap, bank shaping, erosion control blanket and seeding. Typical installation consists of 7 streambarbs, each 7' tall and 60' long protecting 650' of bank. Stream with 100 sq miles or more drainage area.

Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.

Associated Practices include: 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; 570-Stormwater Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion.

Soil Erosion: The streambank is unstable.

Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.

Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.

Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.

For Soil Erosion: The streambank is stable.

For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.

For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.

For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Scenario Feature Measure: Lineal Feet of bank protected

Scenario Unit: Linear Foot

Scenario Typical Size: 650

Scenario Cost: $42,045.00 **Scenario Cost/Unit:** $64.68

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, wet, side cast, large equipment	1228	Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$4.10	42	$172.20
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$111.14	40	$4,445.60
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	40	$1,185.60
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	40	$1,546.00
Materials						
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$23.93	1430	$34,219.90
Mobilization						

Mobilization

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

Practice: 580 - Streambank and Shoreline Protection

Scenario: #7 - Weir/Riffle Small

Scenario Description:

Protection of streambanks using a rock riffle to stabilize and protect banks of streams or excavated channels against scour and erosion by controlling down cutting. Additional structural measures may also include tree revetments; log, rootwad and boulder revetments; dormant post plantings; piling revetments with wire or geotextile fencing; piling revetments with slotted fencing; jacks or jack fields; rock riprap; and gabions.

The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost includes rock rip rap, bank shaping, erosion control blanket and seeding. Typical installation consists of a 1' high riffle on a stream with a 8' bottom width and 5' banks.

Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.

Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; 570-Stormwater Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion.

Soil Erosion: The streambank is unstable.

Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.

Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.

Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.

For Soil Erosion: The streambank is stable.

For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.

For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.

For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Scenario Feature Measure: Per structure installed

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $2,990.76 **Scenario Cost/Unit:** $2,990.76

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, wet, side cast, large equipment	1228	Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$4.10	24	$98.40
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$111.14	6	$666.84
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	6	$231.90
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	6	$177.84
Materials						
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$23.93	56	$1,340.08

Mobilization

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

Practice: 580 - Streambank and Shoreline Protection

Scenario: #8 - Weir/Riffle Medium

Scenario Description:

Protection of streambanks using a rock riffle to stabilize and protect banks of streams or excavated channels against scour and erosion by controlling down cutting. Additional structural measures may also include tree revetments; log, rootwad and boulder revetments; dormant post plantings; piling revetments with wire or geotextile fencing; piling revetments with slotted fencing; jacks or jack fields; rock riprap; and gabions.

The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost includes rock rip rap, bank shaping, erosion control blanket and seeding. Typical installation consists of a 1.5' high riffle on a stream with a 20' bottom width and 6' banks.

Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.

Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; 570-Stormwater Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion.

Soil Erosion: The streambank is unstable.

Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.

Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.

Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.

For Soil Erosion: The streambank is stable.

For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.

For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.

For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Scenario Feature Measure: Per structure installed

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $5,905.64 **Scenario Cost/Unit:** $5,905.64

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, wet, side cast, large equipment	1228	Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$4.10	62	$254.20
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$111.14	12	$1,333.68
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	12	$355.68
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	6	$231.90
Materials						
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$23.93	136	$3,254.48

Mobilization

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

Practice: 580 - Streambank and Shoreline Protection

Scenario: #9 - Weir/Riffle Large

Scenario Description:

Protection of streambanks using a rock riffle to stabilize and protect banks of streams or excavated channels against scour and erosion by controlling down cutting. Additional structural measures may also include tree revetments; log, rootwad and boulder revetments; dormant post plantings; piling revetments with wire or geotextile fencing; piling revetments with slotted fencing; jacks or jack fields; rock riprap; and gabions.

The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost includes rock rip rap, bank shaping, erosion control blanket and seeding. Typical installation consists of a 1.5' high riffle on a stream with a 30' bottom width and 7' banks.

Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.

Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; 570-Stormwater Runoff Control.

Before Situation:

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion.

Soil Erosion: The streambank is unstable.

Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.

Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.

Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Situation:

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.

For Soil Erosion: The streambank is stable.

For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.

For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.

For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Scenario Feature Measure: Per structure installed

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $7,731.53 **Scenario Cost/Unit:** $7,731.53

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, wet, side cast, large equipment	1228	Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$4.10	84	$344.40
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$111.14	16	$1,778.24
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	16	$474.24
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	6	$231.90
Materials						
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$23.93	185	$4,427.05

Mobilization

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

Practice: 582 - Open Channel

Scenario: #1 - Two stage ditch

Scenario Description:

This scenario is the improvement of a channel in which water flows with a free surface. The practice is used for the restoration of a natural or artificial channel to improve nutrient (phosphorus and nitrate) reduction and ecological function by creating a floodplain bench. Installation conditions are normal which means the location is easily accessible from a main road, soils are without large rock or difficult clay to excavate, and/or other aspects are average compared to excavation work in the area.

Before Situation:

A stream or channel with active streambank erosion and excess nutrient load from upstream or tile entry sources. This scenario assists in addressing the resource concerns: water quality, streambank erosion, sediment deposition.

After Situation:

An earthen floobplain bench is excavated above low channel flow to create floodplain flow area and to stabilize the bottom and side slopes. Nutrients are reduced in the water through bench saturation. Erosion is no longer a resource concern. Typical construction dimensions are similar to Fig. 10-9 in Stream Restoration Design handbook with 10 ft wide benchs excavated on either side of 6 ft deep ditch. Total excavation = 5' x 10' X 2 sides = 100 cubic feet per foot. Cool season grasses are established on the bench and slope areas using 342 Critical Area Planting. Need for mulching (straw or erosion control blanket) would be accomplished through 484-Mulching as necessary. Associated practices: 356-Dike, 393-Filter Strip, 484-Mulching 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

Scenario Feature Measure: length of channel

Scenario Unit: Linear Foot

Scenario Typical Size: 1,000

Scenario Cost: $11,106.42 **Scenario Cost/Unit:** $11.11

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$2.25	3700	$8,325.00
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$65.49	24	$1,571.76
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	24	$711.36
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	2	$498.30

Practice: 585 - Stripcropping

Scenario: #1 - Stripcropping - water erosion

Scenario Description:

This scenario describes the implementation of a stripcropping system that is designed specifically for the control of water erosion or minimizing the transport of sediments or other water borne contaminants originating from runoff on cropland. The planned stripcropping system will meet the current 585 standard. Implementation will result in alternating strips of erosion susceptible crops with erosion resistant crops that are oriented as close to perpendicular to water flows as possible. The designed system will reduce erosion/sediment/contaminants to desired objectives. Payment for implementation is to defray the costs of designing the system, installing the strips on the landscape appropriately, and integrating a crop rotation that includes water erosion resistant species.

Before Situation:

In this geographic area, excessive water erosion is caused by raising crops in a manner that allows water flows to travel unimpeded down the slope due to lack of residue or other conservation measures causing sheet and rill erosion or concentrated flow conditions, degradation of soil health through loss of topsoil and organic matter, along with offsite negative impacts to water quality and aquatic wildlife habitat.

After Situation:

A stripcropping system that includes at least two or more strips within the planning slope will be designed to include parallel strips of approximately equal widths of water erosion resistant crop species with non-water erosion resistant crop species. Widths will be determined using current water erosion prediction technology to meet objectives. The design and implementation of a stripcropping system will minimize sheet and rill erosion, protect soil quality, reduce offsite sedimentation, and benefit offsite aquatic wildlife habitat. Erosion prediction before and after practice application will be recorded showing the design and benefits of the practice. Erosion -resistant strips in rotation must be managed to maintain the planned vegetative cover and surface roughness.

Scenario Feature Measure: area of strips

Scenario Unit: Acre

Scenario Typical Size: 80

Scenario Cost: $360.27 **Scenario Cost/Unit:** $4.50

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$36.22	3	$108.66
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	3	$62.43
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	2	$189.18

Practice: 587 - Structure for Water Control

Scenario: #1 - Inline Stoplog WCS, Surface Water Control, 6-10 in. dia. Pipe

Scenario Description:

An Inline Water Control Structure (WCS) composed of plastic that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concern: Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at point along a pipe extending through an embankment, providing ease of access to the structure and provide better protection against beaver activity. There are commercially available models composed of plastic that are commonly used when the width of the is 24" or less. Cost estimate is based on a using a such a commercial product. The typical scenario is an inline structure with a width of 12", height of six feet, The pipe is 65' of 8" SCH 40 PVC (inlet and outlet combined).

Before Situation:

The landowner wishes to provide for a way to control the water surface elevation in a wetland area. The landowner wishes to enhance and enlarge the area to provide habitat for fish and wildlife.

After Situation:

A WCS is installed in a flow line allowing shallow water impoundments. A wetland area is enhanced and water levels can be varied to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $2,659.92 **Scenario Cost/Unit:** $2,659.92

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$54.57	2	$109.14
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$5.51	55	$303.05
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	$29.64	2	$59.28
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	8	$166.48
Materials						
Water Control Structure, Stoplog, Inline, variable cost portion	2146	Variable cost portion of a Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Calculate total variable costs by multiplying by the structure height x pipe diameter. Materials only.	Height x Diameter	$11.96	48	$574.08
Water Control Structure, Stoplog, Inline, fixed costs portion	2145	Fixed cost portion of Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Fixed cost portion. Materials only.	Each	$309.67	1	$309.67
Steel, Plate, ⅛"	1047	Flat Steel Plate, ⅛" thick, materials only.	Square Foot	$4.62	36	$166.32
Trash Guard, metal	1608	Trash Guard, fabricated-steel, includes materials, equipment, and labor to transport and place Conical shaped trash guard for drop inlet spillway. Typically fabricated of CMP and steel. Includes materials, equipment, and labor to fabricate and transport	Pound	$2.42	40	$96.80
Pipe, PVC, 8", SCH 40	981	Materials: - 8" - PVC - SCH 40 - ASTM D1785	Foot	$9.63	65	$625.95
Mobilization						

Mobilization

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

Practice: 587 - Structure for Water Control

Scenario: #2 - Inline Stoplog WCS, Surface Water Control, 12-18 in. dia. Pipe

Scenario Description:

An Inline Water Control Structure (WCS) composed of plastic that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concern: Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at point along a pipe extending through an embankment, providing ease of access to the structure and provide better protection against beaver activity. There are commercially available models composed of plastic that are commonly used when the width of the is 24" or less. Cost estimate is based on a using a such a commercial product. The typical scenario is an inline structure with a width of 20", height of six feet, The pipe is 65' of 15" SDR35 PVC (inlet and outlet combined).

Before Situation:

The landowner wishes to provide for a way to control the water surface elevation in a wetland area. The landowner wishes to enhance and enlarge the area to provide habitat for fish and wildlife.

After Situation:

A WCS is installed in a flow line allowing shallow water impoundments. A wetland area is enhanced and water levels can be varied to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure: Number of Structures

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $3,613.35 **Scenario Cost/Unit:** $3,613.35

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$54.57	2	$109.14
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$5.51	55	$303.05
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	8	$166.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	2	$59.28
Materials						
Steel, Plate, ⅛"	1047	Flat Steel Plate, ⅛" thick, materials only.	Square Foot	$4.62	36	$166.32
Steel, Plate, 3/8"	1375	Flat steel plate, 3/8" thickness. Materials only.	Square Foot	$13.99	4	$55.96
Trash Guard, metal	1608	Trash Guard, fabricated-steel, includes materials, equipment, and labor to transport and place Conical shaped trash guard for drop inlet spillway. Typically fabricated of CMP and steel. Includes materials, equipment, and labor to fabricate and transport	Pound	$2.42	80	$193.60
Pipe, PVC, 15", SDR 35	1722	Materials: 15" - PVC - SDR35 - ASTM D3034	Foot	$14.22	65	$924.30
Water Control Structure, Stoplog, Inline, variable cost portion	2146	Variable cost portion of a Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Calculate total variable costs by multiplying by the structure height x pipe diameter. Materials only.	Height x Diameter	$11.96	90	$1,076.40

Materials

Water Control Structure, Stoplog, Inline, fixed costs portion	2145	Fixed cost portion of Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Fixed cost portion. Materials only.	Each	$309.67	1	$309.67

Mobilization

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

Practice: 587 - Structure for Water Control

Scenario: #3 - Inline Stoplog WCS, Surface Water Control, >18 in. dia. Pipe

Scenario Description:

An Inline Water Control Structure (WCS) composed of plastic that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concern: Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at point along a pipe extending through an embankment, providing ease of access to the structure and provide better protection against beaver activity. There are commercially available models composed of plastic that are commonly used when the width of the is 24" or less. Cost estimate is based on a using a such a commercial product. The typical scenario is an inline structure with a width of 31", height of six feet, The pipe is 65' of 24" used steel (inlet and outlet combined).

Before Situation:

The landowner wishes to provide for a way to control the water surface elevation in a wetland area. The landowner wishes to enhance and enlarge the area to provide habitat for fish and wildlife.

After Situation:

A WCS is installed in a flow line allowing shallow water impoundments. A wetland area is enhanced and water levels can be varied to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $7,256.06 **Scenario Cost/Unit:** $7,256.06

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$54.57	2	$109.14
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$5.51	55	$303.05
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	8	$166.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	2	$59.28
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	10	$311.90
Materials						
Water Control Structure, Stoplog, Inline, variable cost portion	2146	Variable cost portion of a Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Calculate total variable costs by multiplying by the structure height x pipe diameter. Materials only.	Height x Diameter	$11.96	144	$1,722.24
Pipe, Steel, 24", Std Wt, USED	1360	Materials: - USED - 24" - Steel Std Wt	Foot	$50.95	65	$3,311.75
Steel, Plate, ⅛"	1047	Flat Steel Plate, ⅛" thick, materials only.	Square Foot	$4.62	49	$226.38
Water Control Structure, Stoplog, Inline, fixed costs portion	2145	Fixed cost portion of Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Fixed cost portion. Materials only.	Each	$309.67	1	$309.67
Steel, Plate, 3/8"	1375	Flat steel plate, 3/8" thickness. Materials only.	Square Foot	$13.99	8	$111.92

Materials

Trash Guard, metal	1608	Trash Guard, fabricated-steel, includes materials, equipment, and labor to transport and place Conical shaped trash guard for drop inlet spillway. Typically fabricated of CMP and steel. Includes materials, equipment, and labor to fabricate and transport	Pound	$2.42	155	$375.10

Mobilization

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

Practice: 587 - Structure for Water Control

Scenario: #4 - Weir Box Inlet WCS, Surface Water Control, <=16 in. dia. Pipe.

Scenario Description:

A structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation or measures water. This practice applies wherever a permanent structure is needed as an integral part of a water-control system. A fabricated weir box structure with a pipe of 16" diameter or less is placed in a levee to manage water level elevation. Payment incorporates pipe, anti seep collar, trash guard, animal guard, flap gate and weir box structure.

Before Situation:

The landowner wishes to provide for a way to control the water surface elevation in a wetland area. The landowner wishes to enhance and enlarge the area to provide habitat for fish and wildlife.

After Situation:

A weir box structure is placed in a levee to manage water level elevation. A wetland area is enhanced and water levels can be varied to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $3,883.68 **Scenario Cost/Unit:** $3,883.68

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$5.51	55	$303.05
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$54.57	2	$109.14
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	8	$249.52
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	2	$59.28
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	8	$166.48
Materials						
Steel, Plate, 3/8"	1375	Flat steel plate, 3/8" thickness. Materials only.	Square Foot	$13.99	4	$55.96
Pipe, Steel, 16", Std Wt, USED	1357	Materials: - USED - 16" - Steel Std Wt	Foot	$29.82	65	$1,938.30
Steel, Plate, ⅛"	1047	Flat Steel Plate, ⅛" thick, materials only.	Square Foot	$4.62	49	$226.38
Steel, Angle, 3" x 3" x 1/4"	1372	Materials: Angle, 3" x 3" x 1/4", Meets ASTM A36	Foot	$3.53	30	$105.90
Trash Guard, metal	1608	Trash Guard, fabricated-steel, includes materials, equipment, and labor to transport and place Conical shaped trash guard for drop inlet spillway. Typically fabricated of CMP and steel. Includes materials, equipment, and labor to fabricate and transport	Pound	$2.42	82	$198.44
Steel, Plate, 3/16"	1048	Flat Steel Plate, 3/16" thick, materials only.	Square Foot	$6.94	32	$222.08
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 587 - Structure for Water Control

Scenario: #5 - Weir Box Inlet WCS, Surface Water Control, >16 in. dia. Pipe.

Scenario Description:

A structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation or measures water. This practice applies wherever a permanent structure is needed as an integral part of a water-control system. A fabricated weir box structure with a pipe of greater than 16" diameter is placed in a levee to manage water level elevation. Payment incorporates pipe, anti seep collar, trash guard, animal guard, flap gate and weir box structure.

Before Situation:

The landowner wishes to provide for a way to control the water surface elevation in a wetland area. The landowner wishes to enhance and enlarge the area to provide habitat for fish and wildlife.

After Situation:

A weir box structure is placed in a levee to manage water level elevation. A wetland area is enhanced and water levels can be varied to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $5,460.88 **Scenario Cost/Unit:** $5,460.88

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$5.51	55	$303.05
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$54.57	2	$109.14
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	$29.64	2	$59.28
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	8	$166.48
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	9	$280.71
Materials						
Trash Guard, metal	1608	Trash Guard, fabricated-steel, includes materials, equipment, and labor to transport and place Conical shaped trash guard for drop inlet spillway. Typically fabricated of CMP and steel. Includes materials, equipment, and labor to fabricate and transport	Pound	$2.42	155	$375.10
Steel, Plate, 3/16"	1048	Flat Steel Plate, 3/16" thick, materials only.	Square Foot	$6.94	32	$222.08
Steel, Angle, 3" x 3" x 1/4"	1372	Materials: Angle, 3" x 3" x 1/4", Meets ASTM A36	Foot	$3.53	30	$105.90
Steel, Plate, ⅛"	1047	Flat Steel Plate, ⅛" thick, materials only.	Square Foot	$4.62	36	$166.32
Steel, Plate, 3/8"	1375	Flat steel plate, 3/8" thickness. Materials only.	Square Foot	$13.99	8	$111.92
Pipe, Steel, 24", Std Wt, USED	1360	Materials: - USED - 24" - Steel Std Wt	Foot	$50.95	65	$3,311.75
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 587 - Structure for Water Control

Scenario: #6 - Weir Box Inlet WCS, Surface Water Control Using Existing Pipe (Box Only)

Scenario Description:

A structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation or measures water. This practice applies wherever a permanent structure is needed as an integral part of a water-control system. A fabricated weir box structure is installed on existing piping.

Before Situation:

The landowner wishes to provide for a way to control the water surface elevation in a wetland area. The landowner wishes to enhance and enlarge the area to provide habitat for fish and wildlife.

After Situation:

A weir box structure is placed in a levee over an existing subsurface system to manage water level elevation. A wetland area is enhanced and water levels can be varied to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $566.80 **Scenario Cost/Unit:** $566.80

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$36.22	2	$72.44
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	4	$124.76
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	$20.81	2	$41.62
Materials						
Steel, Angle, 3" x 3" x 1/4"	1372	Materials: Angle, 3" x 3" x 1/4", Meets ASTM A36	Foot	$3.53	30	$105.90
Steel, Plate, 3/16"	1048	Flat Steel Plate, 3/16" thick, materials only.	Square Foot	$6.94	32	$222.08

Practice: 587 - Structure for Water Control

Scenario: #7 - Watertight Flapgate Inflow WCS, Surface Water Control, <=15 in. dia. Pipe

Scenario Description:

A structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation or measures water. This practice applies wherever a permanent structure is needed as an integral part of a water-control system. A Flap/Slide Gate with a pipe of 15" diameter or less is placed in a levee to manage water level elevation. Payment incorporates pipe, anti seep collar, trash guard, animal guard, and flap gate.

Before Situation:

A wetland or other area is in need of a flap gate to control the flow of water through a pipe to provide habitat for fish and wildlife. The landowner wishes to provide a way for water to flow into a managed wetland pool yet automatically prevent flow from leaving the pool when the water source inflow head becomes less than the pool head.

After Situation:

A WCS pipe with flap gate 15" or less in diameter is installed. The pipe is installed through a water management embankment allowing shallow water impoundments to take on water from a higher elevation such as floodwater. When the surface of the inflow water source drops to an elevation that is lower than the wetland pool water surface, the flap gate automatically closes, preventing the loss of water from the wetland area. A wetland area is enhanced by having the ability to automatically fill with water when the hydrologic opportunity presents itself to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $2,533.97 **Scenario Cost/Unit:** $2,533.97

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	6	$327.42
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	6	$177.84
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	4	$124.76
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	$20.81	12	$249.72
Materials						
Pipe, PVC, 15", SDR 35	1722	Materials: 15" - PVC - SDR35 - ASTM D3034	Foot	$14.22	65	$924.30
Steel, Plate, ⅛"	1047	Flat Steel Plate, ⅛" thick, materials only.	Square Foot	$4.62	49	$226.38
Steel, Plate, 3/8"	1375	Flat steel plate, 3/8" thickness. Materials only.	Square Foot	$13.99	4	$55.96
Trash Guard, metal	1608	Trash Guard, fabricated-steel, includes materials, equipment, and labor to transport and place Conical shaped trash guard for drop inlet spillway. Typically fabricated of CMP and steel. Includes materials, equipment, and labor to fabricate and transport	Pound	$2.42	82	$198.44
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 587 - Structure for Water Control

Scenario: #8 - Watertight Flapgate Inflow WCS, Surface Water Control, >15 in. dia. Pipe

Scenario Description:

A structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation or measures water. This practice applies wherever a permanent structure is needed as an integral part of a water-control system. A Flap/Slide Gate with a pipe of greater than 15" diameter is placed in a levee to manage water level elevation. Payment incorporates pipe, anti seep collar, trash guard, animal guard, and flap gate.

Before Situation:

A wetland or other area is in need of a flap gate to control the flow of water through a pipe to provide habitat for fish and wildlife. The landowner wishes to provide a way for water to flow into a managed wetland pool yet automatically prevent flow from leaving the pool when the water source inflow head becomes less than the pool head.

After Situation:

A WCS pipe with flap gate greater than 15" in diameter is installed. The pipe is installed through a water management embankment allowing shallow water impoundments to take on water from a higher elevation such as floodwater. When the surface of the inflow water source drops to an elevation that is lower than the wetland pool water surface, the flap gate automatically closes, preventing the loss of water from the wetland area. A wetland area is enhanced by having the ability to automatically fill with water when the hydrologic opportunity presents itself to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $3,971.68 **Scenario Cost/Unit:** $3,971.68

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	6	$327.42
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	12	$249.72
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	6	$177.84
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	5	$155.95
Materials						
Trash Guard, metal	1608	Trash Guard, fabricated-steel, includes materials, equipment, and labor to transport and place Conical shaped trash guard for drop inlet spillway. Typically fabricated of CMP and steel. Includes materials, equipment, and labor to fabricate and transport	Pound	$2.42	155	$375.10
Pipe, PVC, 24", PS 46	1254	Pipe, PVC, PS 46, 24" Diameter - ASTM F679. Material cost only.	Each	$32.28	65	$2,098.20
Steel, Plate, ⅛"	1047	Flat Steel Plate, ⅛" thick, materials only.	Square Foot	$4.62	49	$226.38
Steel, Plate, 3/8"	1375	Flat steel plate, 3/8" thickness. Materials only.	Square Foot	$13.99	8	$111.92
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 587 - Structure for Water Control

Scenario: #9 - Inline WCS, Subsurface Drainage Control, <=10 in. dia. Pipe

Scenario Description:

A subsurface drainage system on a field with a fairly flat slope (less than 2% and preferably less than 1%) outlets through a control structure which is operated with stoplogs. This allows the operator to keep the water in the soil profile when it is not critical to dry the soil. This retention time allows nutrients to be reduced by bacteria such that the nutrients do not leave with the water. A single stoplog structure may have its influence extended by buried float-activated structures which can be counted as structures also for a separate payment. Resource Concerns: Water Quality Degradation (Nutrients). Associated Practices: 606 - Subsurface Drain; 554 - Drainage Water Management

Before Situation:

The discharge from a subsurface drainage system enters ditches or streams, often laden with sediment and nutrients.

After Situation:

The discharge from a subsurface drainage system enters ditches or streams only when the soil profile needs to be dry. The retention time in the soil profile removes nutrients. Typical affected area for a single structure is 10-20 acres. A single structure with stoplogs may have its influence extended by use of buried float-activated control structures, which may be paid for as separate structures also.

Scenario Feature Measure: Number of Structures

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $1,639.01 **Scenario Cost/Unit:** $1,639.01

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	3	$163.71
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	2	$41.62
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	3	$115.95
Materials						
Pipe, PVC, 8", SDR 35	994	Materials: - 8" - PVC - SDR 35 - ASTM D3034	Foot	$6.66	40	$266.40
Water Control Structure, Stoplog, Inline, fixed costs portion	2145	Fixed cost portion of Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Fixed cost portion. Materials only.	Each	$309.67	1	$309.67
Water Control Structure, Stoplog, Inline, variable cost portion	2146	Variable cost portion of a Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Calculate total variable costs by multiplying by the structure height x pipe diameter. Materials only.	Height x Diameter	$11.96	48	$574.08
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	$167.58	1	$167.58

Practice: 587 - Structure for Water Control

Scenario: #10 - Inline WCS, Subsurface Drainage Control, >10 in. dia. Pipe

Scenario Description:

A subsurface drainage system on a field with a fairly flat slope (less than 2% and preferably less than 1%) outlets through a control structure which is operated with stoplogs. This allows the operator to keep the water in the soil profile when it is not critical to dry the soil. This retention time allows nutrients to be reduced by bacteria such that the nutrients do not leave with the water. A single stoplog structure may have its influence extended by buried float-activated structures which can be counted as structures also for a separate payment. Resource Concerns: Water Quality Degradation (Nutrients). Associated Practices: 606 - Subsurface Drain; 554 - Drainage Water Management

Before Situation:

The discharge from a subsurface drainage system enters ditches or streams, often laden with sediment and nutrients.

After Situation:

The discharge from a subsurface drainage system enters ditches or streams only when the soil profile needs to be dry. The retention time in the soil profile removes nutrients. Typical affected area for a single structure is 10-20 acres. A single structure with stoplogs may have its influence extended by use of buried float-activated control structures, which may be paid for as separate structures also.

Scenario Feature Measure: Number of Structures

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $2,229.65 **Scenario Cost/Unit:** $2,229.65

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	3	$163.71
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	3	$115.95
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	2	$41.62
Materials						
Pipe, PVC, dia. < 18", weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	$1.50	380	$570.00
Water Control Structure, Stoplog, Inline, fixed costs portion	2145	Fixed cost portion of Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Fixed cost portion. Materials only.	Each	$309.67	1	$309.67
Water Control Structure, Stoplog, Inline, variable cost portion	2146	Variable cost portion of a Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Calculate total variable costs by multiplying by the structure height x pipe diameter. Materials only.	Height x Diameter	$11.96	72	$861.12
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	$167.58	1	$167.58

Practice: 587 - Structure for Water Control

Scenario: #11 - Inline WCS, Subsurface Drainage Control, float activated head pressure valve

Scenario Description:

A subsurface drainage system on a field with a fairly flat slope (less than 2% and preferably less than 1%) outlets through an inline water level control structure which is used in conjunction with 3 float activated head pressure valves. Each float activated head pressure valve increases the zone of influence by 1'. This allows the operator to keep the water in the soil profile when it is not critical to dry the soil. This retention time allows nutrients to be reduced by bacteria such that the nutrients do not leave with the water. Multiple buried float-activated structures can be used to extend the influence of a single inline water control structure. Resource Concerns: Water Quality Degradation (Nutrients). Associated Practices: 606 - Subsurface Drain; 554 - Drainage Water Management

Before Situation:

The discharge from a subsurface drainage system enters ditches or streams, often laden with sediment and nutrients.

After Situation:

The discharge from a subsurface drainage system enters ditches or streams only when the soil profile needs to be dry. The retention time in the soil profile removes nutrients. Typical affected area for a single structure is 10-20 acres.

Scenario Feature Measure: Number of Structures

Scenario Unit: Each

Scenario Typical Size: 3

Scenario Cost: $3,464.40 **Scenario Cost/Unit:** $1,154.80

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	9	$491.13
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$38.65	9	$347.85
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	6	$124.86
Materials						
Pipe, PVC, 6", SDR 35	993	Materials: - 6" - PVC - SDR 35 - ASTM D3034	Foot	$3.71	120	$445.20
Water Level Control Valve, Inline	2189	Automatic float valve for drainage pipes up to 8"dia. To maintain head differential in flowing agricultural drains.	Each	$629.26	3	$1,887.78
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	$167.58	1	$167.58

Practice: 587 - Structure for Water Control

Scenario: #12 - Straight Pipe, Surface Water Control, <=10 in. dia. Pipe (w/o adjustable control)

Scenario Description:

Used as an outlet for Wetland; no drop box; straight through 10" diameter PVC pipe; pipe is backfilled with #57 stone to 1' over the top of the pipe; 12" thick layer of Type D riprap is placed at the outlet end with 6" thick of #57 stone under it.

Before Situation:

The landowner wishes to establish a wetland area to provide habitat for fish and wildlife.

After Situation:

A straight pipe (principal spillway) is installed through an earth embankment to create a wetland. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure: Feet of pipe installed

Scenario Unit: Foot

Scenario Typical Size: 30

Scenario Cost: $1,271.48 **Scenario Cost/Unit:** $42.38

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	5	$272.85
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	5	$104.05
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	5	$148.20
Materials						
Pipe, PVC, 10", SDR 35	1251	Pipe, PVC, SDR 35, 10" Diameter - ASTM D3034. Material cost only.	Foot	$10.42	30	$312.60
Rock Riprap, graded, angular, material only	2131	Graded Rock Riprap for 12" to 24" size ranges. Includes material costs only. Shipping not inlcuded.	Ton	$19.79	2	$39.58
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	5	$145.05
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 587 - Structure for Water Control

Scenario: #13 - Straight Pipe, Surface Water Control, >=12 in. dia. Pipe (w/o adjustable control)

Scenario Description:

Used as an outlet for Wetland; no drop box; straight through 12" diameter PVC pipe; pipe is backfilled with #57 stone to 1' over the top of the pipe; 12" thick layer of Type D riprap is placed at the outlet end with 6" thick of #57 stone under it.

Before Situation:

The landowner wishes to establish a wetland area to provide habitat for fish and wildlife.

After Situation:

A straight pipe (principal spillway) is installed through an earth embankment to create a wetland. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure: Feet of pipe installed

Scenario Unit: Foot

Scenario Typical Size: 30

Scenario Cost: $1,518.89 **Scenario Cost/Unit:** $50.63

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.57	5	$272.85
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$29.64	5	$148.20
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	5	$104.05
Materials						
Pipe, PVC, dia. < 18", weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	$1.50	354	$531.00
Rock Riprap, graded, angular, material only	2131	Graded Rock Riprap for 12" to 24" size ranges. Includes material costs only. Shipping not inlcuded.	Ton	$19.79	2	$39.58
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$29.01	6	$174.06
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$249.15	1	$249.15

Practice: 590 - Nutrient Management

Scenario: #2 - Basic NM

Scenario Description:

This scenario describes the implementation of a basic nutrient management system on cropland or hayland (non-organic and organic) where there is no manure application. The planned NM system will meet the current 590 standard. Implementation will result in the proper rate, source, method of placement, and timing of nutrients. Payment for implementation is to defray the costs of soil testing, analysis, consultant services that provide nutrient recommendations based on Land Grant University (LGU) recommendations or crop removal rates and an associated nutrient budget, and recordkeeping. Records demonstrating implementation of the 4 R's of the NM criteria will be required.

Before Situation:

A fertility program is either non existent or does not meet the 590 nutrient management standard. Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff or soil erosion or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients.

After Situation:

Plan Development

• A nutrient management system will be developed to meet the NRCS 590 standard.

• The development and implementation of a nutrient management plan (NMP) will benefit plant productivity and reduce off-site degradation.

• A nutrient management budget will be developed for each field(s) based on soil test analysis and land grant university recommendations or crop removal rates.

Testing/Nutrient Data Collection

• On planning units typically 40 acres or larger, soil testing is completed according to LGU recommendations. The use of pre-plant soil tests will assist with the proper development of the annual nutrient budget.

• The use of post-harvest soil tests (results interpreted by crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts.

Producer Activities/Equipment Needed

• Records are maintained annually documenting current soil test, analysis, amount of application, forms and rates of nutrients for each field, including post harvest analysis.

• Applications will be completed in a manner that minimizes nutrient runoff and leaching or build up of excess nutrient concentrations.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: $664.92 **Scenario Cost/Unit:** $16.62

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$36.22	1	$36.22
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	6	$567.54
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	2	$41.62
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$9.77	2	$19.54

Practice: 590 - Nutrient Management

Scenario: #3 - Basic NM with Manure

Scenario Description:

This scenario describes the implementation of a basic nutrient management system on cropland or hayland (non-organic and organic) where there is manure or compost application in addition to commercial fertilizer applications. The planned NM system will meet the current 590 standard. Implementation will result in the proper rate, source, method of placement, and timing of nutrients while minimizing off-site degradation or the excessive built up of N and P. Payment for implementation is to defray the costs of soil testing, manure testing, analysis, proper implementation, consultant services that provide nutrient recommendations based on Land Grant University (LGU) recommendations or crop removal rates and an associated nutrient budget, and recordkeeping. Risk assessments including PI (phosphorus index) and NI (nitrogen index) will be completed with applications of manure completed based on risk results. Records demonstrating implementation of the 4 R's of the NM plan will be required along with copies of risk assessments.

Before Situation:

A fertility program is either non existent or does not meet the 590 nutrient management standard. Soil testing and manure testing is not completed on a regular basis and applications of nutrients are not based on land grant university recommendations or a nutrient budget. Nutrients and manure solids are transported to surface waters through runoff or erosion or to groundwater through leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection often times resulting in wind, sheet, rill, and ephemeral erosion.

After Situation:

Plan Development

• A nutrient management system that includes manure as a source will be developed to meet the NRCS 590 standard.

• The development and implementation of a nutrient management plan (NMP) will benefit plant productivity and reduce off-site degradation.

• A nutrient management plan will be developed for each field(s) based on soil tests and manure test analysis along with land grant university recommendations or crop removal rates.

Testing/Nutrient Data Collection

• Soil testing is completed according to LGU recommendations.

• The use of pre-plant soil tests will assist with the proper development of the annual nutrient budget. Applications of manure are based on risk assessments (PI - phosphorus index).

• The use of post-harvest soil tests (results interpreted by crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N.

• The use of Pre side-dress soil nitrogen test (PSNT) or a Pre Top Dress Tissue test (PTDTT) prior to the rapid biomass growth of the plant will assist the producer in evaluating the mineralization of Nitrogen from manures / cover crops in providing adequate nitrogen to meet the crop requirements, thus reducing the potential for off-site impacts.

Producer Activities/Equipment Needed

• Records are maintained annually documenting current soil tests, manure tests, analyses, amount of application, forms and rates of nutrients for each field, including post harvest analysis.

• Applications will be completed in a manner that minimizes nutrient runoff and leaching or build up of excess nutrient concentrations.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: $1,014.99 **Scenario Cost/Unit:** $25.37

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$36.22	1	$36.22
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	9	$851.31
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	3	$62.43
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$9.77	2	$19.54

Materials

Test, Manure Analysis	306	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$45.49	1	$45.49

Practice: 590 - Nutrient Management

Scenario: #4 - Enhanced NM

Scenario Description:

This scenario describes a conventional cropping system where either no nutrient management or only a basic level of nutrient management is being practiced. An enhanced nutrient management system includes activites such as split applications, multiple nutrient concentration tests (other than only soil tests) and methods that more concisely enable scheduling of appropriate fertilizer applications. Nutrients are transported to surface waters through runoff or wind erosion in quantities that degrade water quality and limit use of

Before Situation:

Conventional fertility programs involve very little or no soil testing. Application of fertilizers and amendments, are completed annually based upon tradition that does not specifically consider the detrimental affects of improper timing or rates of nutrients, or excess nutrient build-up in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Runoff flows into adjacent streams, water courses, tile drains, field surface drains, or other water courses causing degradation to receiving waters or leaching of nutrients to shallow ground water sources. There is typically no environmental evaluation of the potential for off-site movement. Soil quality may also be detrimentally affected.

After Situation:

Plan Development:

• The development and implementation of a Nutrient Management Plan (NMP) that meets and exceeds the NRCS 590 standard will benefit plant productivity and reduce off-site movement of nutrients.

• The NMP will stress the use of the four R's (Right Source of Nutrients, Right Time of Application, Right Rate, and Right Method of Application).

• These include practices such as use of split applications, slow release nutrients, proper timing of application, more appropriate formulations, banding, etc.

• A nutrient budget is developed for each field or section of field annually.

• Further minimization of risk is accomplished by identifying the variability across the field(s) by using soil survey maps or other simple techniques to establish zones, along with zonal soil testing.

Testing/Nutrient data collection:

• The use of pre-plant soil tests will assist with the development of the annual nutrient budget in accordance with Land Grant University fertilizer guides.

• Soil testing is completed according to Land Grant University (LGU) recommendations.

• Use of a post-harvest soil test (interpreted by a crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts.

• Analysis are completed at least once every three years for N-P-K (soil tests).

Producer Activities/Equipment Needed:

• Applications of nutrients are completed using a GPS guided variable rate fertilizer applicator.

• Application of nutrients via fertilizers, and/or manures applied in a manner that minimizes nutrient runoff and leaching.

• Application rates of all sources of nutrients are based upon soil tests and either LGU recommendations, crop removal rates, or industry standard.

• Record keeping will document application of nutrients based on the 4 R's.

• Nutrients are applied at rates based on soil test zone analyses.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: $1,556.95 **Scenario Cost/Unit:** $38.92

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Fertilizer, precision application	952	Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acre	$10.58	40	$423.20
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	$29.86	2	$59.72
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$36.22	2	$72.44
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	2	$41.62

Labor

Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	8	$756.72

Materials

Test, Soil Test, Precision, Grid or Zone	300	Includes materials, shipping, labor, and equipment costs.	Each	$13.55	15	$203.25

Practice: 590 - Nutrient Management

Scenario: #5 - Enhanced NM with Manure

Scenario Description:

This scenario describes a conventional cropping system where either no nutrient management or only a basic nutrient management is being practiced. Manure is applied in addition to commercial fertilizer. An enhanced nutrient management system includes split applications and multiple nutrient concentration tests (other than only soil tests) and methods that more concisely enable scheduling of appropriate fertilizer applications. Nutrients are transported to surface waters through runoff or wind erosion in quantities that degrade water quality and limit use of intended purposes.

Before Situation:

In this geographic area, conventional fertility programs involve very little or no soil or manure testing. Application of fertilizers, including manures and amendments, are completed annually based upon tradition that does not specifically consider the detrimental affects of improper timing or rates of nutrients, or excess nutrient build-up in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral gully erosion by spring. Runoff flows into adjacent streams, water courses, tile drains, field surface drains, or other water courses causing degradation to receiving waters or leaching of nutrients to shallow ground water sources. There is typically no environmental evaluation of the potential for off-site movement. Soil quality may also be detrimentally affected.

After Situation:

Plan Development

• The development and implementation of a Nutrient Management Plan (NMP) that meets and exceeds the NRCS 590 standard will benefit plant productivity and reduce off-site movement of nutrients.

• The NMP will stress the use of the four R's (Right Source of Nutrients, Right Time of Application, Right Rate, and Right Method of Application).

• These include practices such as use of split applications, slow release nutrients, proper timing of application, more appropriate formulations, banding, etc.

• A nutrient budget is developed for each field or section of field annually.

Testing/Nutrient data collection

• Soil testing is completed according to LGU recommendations.

• Analysis are completed at least once every three years for N-P-K (soil tests).

• The use of pre-plant soil tests will assist with the development of the annual nutrient budget in accordance with Land Grant University fertilizer guides.

• Use of a post-harvest soil test and manure tests (interpreted by a crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts.

• Further minimization of risk is accomplished by identifying the variability across the field(s) by using soil survey maps or other simple techniques to establish zones, along with zonal soil testing.

Producer Activities/Equipment Needed

• Applications of nutrients are completed using a GPS guided variable rate fertilizer applicator. Record keeping will document application of nutrients based on the 4 R's. Nutrients and manure are applied at rates based on soil test zone analyses. Typical treatment area is 40 acres.

• Application of nutrients via fertilizers, and/or manures applied in a manner that minimizes nutrient runoff and leaching.

• Application rates of all sources of nutrients are based upon soil tests and either LGU recommendations, crop removal rates, or industry standard.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: $2,022.42 **Scenario Cost/Unit:** $50.56

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$36.22	2	$72.44
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	$29.86	2	$59.72
Fertilizer, precision application	952	Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acre	$10.58	40	$423.20

Labor

Labor

Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	12	$1,135.08
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	4	$83.24

Materials

Test, Soil Test, Precision, Grid or Zone	300	Includes materials, shipping, labor, and equipment costs.	Each	$13.55	15	$203.25
Test, Manure Analysis	306	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$45.49	1	$45.49

Practice: 590 - Nutrient Management

Scenario: #6 - Enhanced NM with Tissue Testing

Scenario Description:

This scenario describes the implementation of an advanced precision nutrient management system on cropland. The planned NM system will meet the current 590 standard. Payment for implementation is to defray the costs of soil testing, analysis, consultant services, skilled labor and specialized nutrient application that provide nutrient proper recommendations based on Land Grant University (LGU) recommendations or crop removal rates and an associated nutrient budget, recordkeeping, and monitoring on a precision level that includes split applications, Normalized Differential Vegetation Index (NDVI) sensing, and aerial imaging. Records are kept demonstrating implementation of the 4 R's of the NM plan. This scenario goes beyond the enhanced system by using technologies that improve efficiency and effectiveness of nutrient management by utilizing specialized precision techniques and tools (variable rate applicators, NDVI, aerial photography, yield monitoring,, plant tissue testing). Precision nutrient mgmt techniques ensure that the right rate, proper timing, and proper placement of nutrients minimize non-point source pollution and provide proper amounts of nutrients to the crop where it is needed and not applying where it is not needed.

Before Situation:

A fertility program is already in place, however, application of nutrients across large acreages is based on a lack of representative soil samples or analyses. The current NM system may or may not meet 590 standards, however, could be improved by reducing energy inputs and utilizing precise mapping and diagnostic equipment. Because whole fields are often fertilized with the same rate, excess nutrients may be applied in some areas while inadequate amounts of nutrients are applied in other areas. Excess nutrients are transported to surface waters through runoff or erosion or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fertilizer applications are made in their entirety more than 30 days prior to planting. Applications do not consider the detrimental affects of improper timing or improper rates. Whole fields with like crops and rotation are fertilized the same.

After Situation:

Plan Development

• An application rate (prescription) is developed for each zone based on representative soil analysis and a zone nutrient budget.
• A nutrient budget is developed for each field annually.
• Yield monitoring maps will be collected and utilized (where technology allows) to develop the following year nutrient applications.

Testing/Nutrient Data Collection

• Soil testing is completed in a fashion that provides a representative assessment of nutrient concentrations in each field or planning unit including zone directed sampling, real time Normalized Differential Vegetation Index (NDVI) sensing, Electrical Conductivity (EC) Index type sampling, or via high definition aerial photography that allows for the identification of numerous variations (zones) in a planning unit.
• Zone maps are created and a nutrient budget developed for each zone.
• Soil testing is completed annually for N and at least once every three years for P-K. Plant tissue samples collected and evaluated.

Producer Activities/Equipment Needed

• Application of nutrients is completed so that non-point source pollution is minimized.
• Nutrients are applied based on realistic yield expectations.
• The average field size is >=40acres.
• Applications of nutrients are completed using a GPS guided variable rate fertilizer applicator.
• Applications of nutrients will be completed in split applications where a majority of the N needs are applied based on the needs of the crop based on growing season requirements.
• Record keeping will include all soil tests, analysis, zone maps, nutrient prescriptions and budgets, and as-applied applications.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: $2,768.11 **Scenario Cost/Unit:** $69.20

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Satellite imagery, aerial photography, infrared	966	Infrared imagery	Acre	$0.16	40	$6.40
Fertilizer, precision application	952	Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acre	$10.58	40	$423.20
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$36.22	4	$144.88
Chlorophyll Reader	1125	Applicator and chlorophyll sensor includes labor. No materials	Acre	$12.77	40	$510.80
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	$29.86	4	$119.44

Labor

Labor

Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	12	$1,135.08
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	2	$62.38
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	6	$124.86

Materials

Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$11.68	1	$11.68
Test, Soil Test, Precision, Grid or Zone	300	Includes materials, shipping, labor, and equipment costs.	Each	$13.55	15	$203.25
Test, Plant Tissue Test	301	Tissue analysis for crops. Includes materials and shipping only.	Each	$26.14	1	$26.14

Practice: 590 - Nutrient Management

Scenario: #7 - Adaptive NM

Scenario Description:

The practice scenario is for the implementation of nutrient management on a small plot where Nitrogen use efficiency is evaluated. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement various nutrient use efficiency improvement methods for timing, rate, method of application, or source of nutrients.

Before Situation:

The practice will be installed on cropland (small grain rotation or typical corn-soybean rotation) to address water quality degradation, air quality degradation and energy concerns. The scenario applies to non-organic and organic operations.

After Situation:

Installation of this scenario will result in adapting the four R's of nutrient management (right source, right rate, right timing and right placement) by following the procedures outlined in Agronomy Technical Note 7 - Adaptive Nutrient Management Process. Replicated plots will be established to evaluate one or more of the 4 R's. Plots with a minimum of 4 replications each of two treatments will be designed, laid out, managed and evaluated with the assistance of an individual certified in nutrient management planning and implementation. Yields and other appropriate data will be measured and statistically summarized following the procedures in Agronomy Technical Note 7 - Adaptive Nutrient Management Process. Results will be used to adapt the nutrient management plan for subsequent years to address nutrient use efficiency and water quality planning criteria with the reasoning clearly explained.

Scenario Feature Measure:

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $3,349.36 **Scenario Cost/Unit:** $3,349.36

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Satellite imagery, aerial photography, infrared	966	Infrared imagery	Acre	$0.16	2	$0.32
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	30	$2,837.70
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	16	$332.96
Materials						
Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$11.68	4	$46.72
Test, Plant Tissue Test	301	Tissue analysis for crops. Includes materials and shipping only.	Each	$26.14	4	$104.56
Test, Soil Test, Precision, Grid or Zone	300	Includes materials, shipping, labor, and equipment costs.	Each	$13.55	2	$27.10

Practice: 590 - Nutrient Management

Scenario: #8 - Enhanced NM w Deep Placement

Scenario Description:

This scenario describes a conventional cropping system where either no nutrient management or only a basic level of nutrient management is being practiced. An enhanced nutrient management system includes activites such as split applications, multiple nutrient concentration tests (other than only soil tests) and methods that more concisely enable scheduling of appropriate fertilizer applications. Nutrients are transported to surface waters through runoff or wind erosion in quantities that degrade water quality and limit use of

Before Situation:

Conventional fertility programs involve very little or no soil testing. Application of fertilizers and amendments, are completed annually based upon tradition that does not adequately consider the detrimental affects of improper timing, placement, or rates of nutrients, or excess nutrient build-up near the soil surface. Fields are overwintered with little or no erosion protection often resulting in sheet, rill, and ephemeral gully erosion by spring. Runoff flows into adjacent streams, water courses, tile drains, field surface drains, or other water courses causing degradation to receiving waters or leaching of nutrients contaminates shallow ground water. There is typically no environmental evaluation of the potential for off-site movement. Soil quality may also be detrimentally affected. The current system is also typically inefficient energy user due to traditional methods, forms, and amounts of nutrient applications.

After Situation:

Plan Development:

• The development and implementation of a Nutrient Management Plan (NMP) that meets and exceeds the NRCS 590 standard will benefit plant productivity and reduce off-site movement of nutrients.

• The NMP will stress the use of the four R's (Right Source of Nutrients, Right Time of Application, Right Rate, and Right Method of Application).

• These include practices such as use of split applications, slow release nutrients, proper timing of application, more appropriate formulations, etc.

• Nutrients must be placed 4-8 inches below the soil surface using a GPS guided VRT Strip Tillage type applicator. Account for the increased erosion potential due to the tillage during application.

• A nutrient budget is developed for each field or section of field annually.

• Further minimization of risk is accomplished by identifying the variability across the field(s) by using soil survey maps or other simple techniques to establish zones, along with zonal soil testing.

Testing/Nutrient data collection:

• The use of pre-plant soil tests will assist with the development of the annual nutrient budget in accordance with Land Grant University fertilizer guides.

• Soil testing is completed according to Land Grant University (LGU) recommendations.

• Use of a post-harvest soil test (interpreted by a crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts.

• Analysis are completed at least once every three years for N-P-K (soil tests).

Producer Activities/Equipment Needed:

• Nutrients must be placed 4-8 inches below the soil surface using a GPS guided VRT Strip Tillage type applicator.

• Application of nutrients via fertilizers, and/or manures applied in a manner that minimizes nutrient runoff and leaching.

• Application rates of all sources of nutrients are based upon soil tests and either LGU recommendations, crop removal rates, or industry standard.

• Record keeping will document application of nutrients based on the 4 R's.

• Nutrients are applied at rates based on soil test zone analyses.

• The producer will attend training of "crop school or nutrient management workshop" or similar activity annually to stay current on crop-specific nutrient management.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 35

Scenario Cost: $2,035.41 **Scenario Cost/Unit:** $58.15

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	$29.86	2	$59.72
Fertilizer, precision application	952	Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acre	$10.58	35	$370.30
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$36.22	8	$289.76
Labor						

Labor

Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	10	$945.90
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	8	$166.48

Materials

Test, Soil Test, Precision, Grid or Zone	300	Includes materials, shipping, labor, and equipment costs.	Each	$13.55	15	$203.25

Practice: 591 - Amend. for Treat. of Ag. Waste

Scenario: #1 - Litter Amendments for Air Quality With Partially Treated Brood Chamber

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 broiler 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) X (Number of applications/year) = Number of 1000SF/year.
21,000 SF / 1000 SF X 1 house X 4 app/yr = 84 units of 1000SF

Scenario Feature Measure: Number of 1000SF applications per year

Scenario Unit: 1,000 Square Foot

Scenario Typical Size: 84

Scenario Cost: $2,318.94 **Scenario Cost/Unit:** $27.61

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
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	$54.51	3.4	$185.33
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	$627.53	3.4	$2,133.60

Practice: 591 - Amend. for Treat. of Ag. Waste

Scenario: #2 - Litter Amendments for Water Quality With Partially Treated Brood Chamber

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 broiler 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) X (Number of applications/year) = Number of 1000SF/year.
21,000 SF / 1000 SF X 1 house X 4 app/yr = 84 units of 1000SF

Scenario Feature Measure: Number of 1000SF applications per year

Scenario Unit: 1,000 Square Foot

Scenario Typical Size: 84

Scenario Cost: $2,200.72 **Scenario Cost/Unit:** $26.20

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
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	$54.51	3.4	$185.33
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	$592.76	3.4	$2,015.38

Practice: 591 - Amend. for Treat. of Ag. Waste

Scenario: #3 - Litter Amendments applied for Air Quality resource concerns

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. The amendment used is proven to reduce ammonia levels in the house by transforming nitrogen into a form of ammonium. The purpose of the practice is to address resource concerns from existing nutrient levels that may contribute to air quality impacts such as objectionable odors and ammonia emissions and impacts on bird health due to excess nutrients and pathogens.
Associated practices: Nutrient Management (590).

Before Situation:

Integrator does not currently apply waste treatment amendments to the litter that reduce ammonia emissions.

After Situation:

This scenario is based on a typical poultry operation with a 2-house facility and each house size is 40' x 400', 16,000 SF. An NRCS approved amendment is applied between flocks, 5 flocks annually, at rate required to meet air quality resource concern, typically 100 pounds per 1000 SF.
Formula to calculate the amount of amendment per year on a 1000 SF basis:
(Square Feet of house) / 1000 SF X (Number of houses) X (Number of Applications per Year)= Number of 1000SF.
16,000 SF / 1000 SF X 2 houses X 5 applications/year= 160 units of 1000SF
An NRCS approved amendment is applied between each flock, 5 applications, at rate required for treatment to address air quality resource concerns. For most products, this is 100 pounds per 1000 SF. The amendment is proven to control the odor, and to reduce ammonia emissions. 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 of objectionable odors, ammonia emissions, PM and PM precursors and bird health resource concerns.

Scenario Feature Measure: Number of 1000SF applications per year

Scenario Unit: 1,000 Square Foot

Scenario Typical Size: 160

Scenario Cost: $5,456.32 **Scenario Cost/Unit:** $34.10

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
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	$54.51	8	$436.08
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	$627.53	8	$5,020.24

Practice: 591 - Amend. for Treat. of Ag. Waste

Scenario: #4 - Litter Amendments applied on a %w/w basis for Water Quality Impacts

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 water-soluble phosphorous in the poultry litter by a specified percentage. The amendment used is proven to and transform nitrogen into a form of ammonium and reduce the concentration of water-soluble phosphorous in the litter and reduces ammonia levels in the house. Resource concerns from existing nutrient levels may contribute to water quality degradation from nutrient runoff and leaching from fields fertilized with poultry litter and air quality impacts such as objectionable odors and ammonia emissions.
Associated practices: Nutrient Management (590).

Before Situation:

Integrator does not currently apply waste treatment amendments to the litter that reduce ammonia emissions and soluble phosphorus.

After Situation:

This scenario is based on a typical poultry operation with a desired application rate is 10% by weight of the litter (10%w/w) of a phosphorus binding amendment. Typical operation consists of 2 houses, 40' x 400' house (16,000 SF), 20,000 birds (4 pound finished bird weight), 0.5 lb litter/bird (assume 54 pounds P205/Ton of litter). The operation raises 5 flocks per year.
Formula to calculate required amendment at the prescribed rate in tons per year is:
(Number of birds) X (Finish weight of birds (lbs)) X (Pounds of litter)/bird) X (Number of houses) X (application rate) X (Number of applications per year) / 2000 pounds/ton
20,000 birds X 4 lb bird X 0.50 lb litter/bird X 2 houses X 0.10 lb amendment/lb litter X 5 app/year / 2000 lb/ton = 20 tons/year.
An NRCS approved amendment is applied between each flock at the prescribed rate. The selected amendment is applied in conformance with the manufacturer's recommendations and the rates required. The amendment is proven to reduce soluble phosphorus in the litter, to control the odor, and to reduce ammonia emissions. 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 due to nutrients in surface and ground water and air quality impacts from objectionable odors, ammonia emissions, PM and PM precursors and bird health resource concerns.

Scenario Feature Measure: Tons of amendment per year.

Scenario Unit: Ton

Scenario Typical Size: 20

Scenario Cost: $12,945.40 **Scenario Cost/Unit:** $647.27

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
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	$54.51	20	$1,090.20
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	$592.76	20	$11,855.20

Practice: 591 - Amend. for Treat. of Ag. Waste

Scenario: #5 - 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: 168,000

Scenario Cost: $31,780.21 **Scenario Cost/Unit:** $0.19

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	6	$124.86
Materials						
Ag Waste Amendment, digestive enzymes, 10 liter container	1688	10 liter container of an organic manure amendment. Liquefied lignite coal. Materials only.	Each	$89.17	355	$31,655.35

Practice: 592 - Feed Management

Scenario: #1 - Cow Dairy - Large

Scenario Description:

Feed ration management on a dairy operation that does not have access to enough acres to spread all of its manure nutrients at an agronomic rate. The resource concerns are water quality degradation, excessive manure nutrients particularly phosphorus and nitrogen. The goal of the practice is to reduce the amount of nutrients in the raw manure so that it is easier for "landlocked" farmers to apply the manure at agronomic rates, thereby reducing or eliminating water quality degradation concerns.

Associated practices: Nutrient management (590), Prescribed Grazing (528), Forage and Biomass Planting (512), Forage Harvest Management (511)

Before Situation:

Producer is feeding a higher level of protein (17%) and phosphorus (0.45%) than is needed to meet National Research Council (NRC) recommendations for a herd of this type and at this stage of production. The operation does not have all of the available acres that it needs to use the nutrients in the manure when spread at agronomic rates causing over application of nutrients on land affecting soil quality, which may lead to water quality degradation.

After Situation:

The scenario assumes the operation milks 500 holstein cows at average weight of 1,400 pounds, or 700 animal units. A baseline analysis of manure, feed, and milk will be completed to determine the current nutrient inputs and outputs. The Producer will reduce feed protein and phosphorus levels to that of NRC recommendations for a herd of this type and at this stage of production (12% protein and 0.35% phosphorus). Producer will explore alternative feedstuffs and alternative feeding strategies to bring manure nitrogen and phosphorus levels down without hurting production of the animals or profitability of the operation. Alternative feeding strategies can include things like grouping animals per similar age or stage of production, or feeding based on individual rolling average production.

Scenario Feature Measure: Number of 1000 pound animal units

Scenario Unit: Animal Unit

Scenario Typical Size: 700

Scenario Cost: $2,591.62 **Scenario Cost/Unit:** $3.70

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	12	$1,135.08
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	20	$416.20
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	10	$311.90
Materials						
Test, Manure Analysis	306	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$45.49	4	$181.96
Test, Feed Analysis	1989	Representative sample of feed. Includes materials and shipping only.	Each	$34.05	16	$544.80
Test, MUN Testing	1990	Testing nitrogen level in milk as a measure of nitrogen that will be exhibited in manure. Includes materials and shipping only.	Each	$0.42	4	$1.68

Practice: 592 - Feed Management

Scenario: #2 - Dairy-Small

Scenario Description:

Feed ration management on a small dairy operation that does not have access to enough acres to spread all of its manure nutrients at an agronomic rate. The resource concerns are water quality degradation, excessive manure nutrients particularly phosphorus and nitrogen. The goal of the practice is to reduce the amount of nutrients in the raw manure so that it is easier for "landlocked" farmers to apply the manure at agronomic rates, thereby reducing or eliminating water quality degradation concerns.

Associated practices: Nutrient management (590), Prescribed Grazing (528), Forage and Biomass Planting (512), Forage Harvest Management (511)

Before Situation:

Producer is feeding a higher level of protein (17%) and phosphorus (0.45%) than is needed to meet National Research Council (NRC) recommendations for a herd of this type and at this stage of production. The operation does not have all of the available acres that it needs to use the nutrients in the manure when spread at agronomic rates causing over application of nutrients on land affecting soil quality, which may lead to water quality degradation.

After Situation:

The scenario assumes the operation milks 50 Jersey and Guernsey cows at average weight of 1,000 pounds, or 50 animal units. A baseline analysis of manure, feed, and milk will be completed to determine the current nutrient inputs and outputs. The Producer will reduce feed protein and phosphorus levels to that of NRC recommendations for a herd of this type and at this stage of production (12% protein and 0.35% phosphorus). The producer will also implement pasturing of his herd part to the time where the animals will obtain some of their diet by grazing pastures as well as explore alternative feedstuffs and alternative feeding strategies to bring manure nitrogen and phosphorus levels down without hurting production of the animals or profitability of the operation.

Scenario Feature Measure: Number of 1000 pound animal units

Scenario Unit: Animal Unit

Scenario Typical Size: 50

Scenario Cost: $1,585.20 **Scenario Cost/Unit:** $31.70

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	6	$567.54
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	10	$311.90
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	12	$249.72
Materials						
Test, Manure Analysis	306	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$45.49	4	$181.96
Test, Feed Analysis	1989	Representative sample of feed. Includes materials and shipping only.	Each	$34.05	8	$272.40
Test, MUN Testing	1990	Testing nitrogen level in milk as a measure of nitrogen that will be exhibited in manure. Includes materials and shipping only.	Each	$0.42	4	$1.68

Practice: 592 - Feed Management

Scenario: #3 - Livestock

Scenario Description:

This example is feed ration management on a swine finishing operation that does not have access to enough acres to spread all of the nutrients in the manure, at agronomic rates. The resource concernss are water quality, and excessive manure nutrients, particularly nitrogen and phosphorus. The goal of the practice is to reduce these excess nutrients to a point where they can be fully utilized at agronomic rates on the existing land base, thereby reducing or eliminating water quality degredation concerns.

Associated Practices: Nutrient management (590)

Before Situation:

The producer is feeding a single diet with a higher level of protein (16%) and phosphorus (0.65%) than is needed to meet National Research Council (NRC) recommendations for animals of this type and at this stage of production.

After Situation:

This scenario's operation currently houses 2800 finishing hogs with an average weight of 154 pounds, or 430 animal units ((2800 hogs * 154 lbs/hog/1000 lbs/AU154)) = 430 AU). The farm typically gows out 2.5 turns per year. A baseline analysis of manure and feed will be completed to determine the current nutrient inputs and outputs. The producer will reduce feed protein and phosphorus levels to that of NRC recommendations for animals of this type and at this stage of production. Producer will consider alternative feedstuffs, phase feeding, split-sex feeding and other scenarios to achieve the objective. Proper feed management removes excess nutrients from the manure, making the manure easier for the producer to properly manage within his/her land constraints. The improved manaure management prevents surface and groundwater degredation from excess nitrogen and phosphorus.

Scenario Feature Measure: Number of 1000 pound animal units

Scenario Unit: Animal Unit

Scenario Typical Size: 1,075

Scenario Cost: $1,994.00 **Scenario Cost/Unit:** $1.85

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	12	$374.28
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	8	$166.48
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	12	$1,135.08
Materials						
Test, Feed Analysis	1989	Representative sample of feed. Includes materials and shipping only.	Each	$34.05	4	$136.20
Test, Manure Analysis	306	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$45.49	4	$181.96

Practice: 592 - Feed Management

Scenario: #4 - Poultry/Layer Operation

Scenario Description:

This example is feed ration management on a poultry or layer operation that does not have access to enough acres to spread all of the nutrients in the manure, at agronomic rates. The resource concernss are water quality, and excessive manure nutrients, particularly nitrogen and phosphorus. The goal of the practice is to reduce these excess nutrients to a point where they can be fully utilized at agronomic rates on the existing land base, thereby reducing or eliminating water quality degredation concerns.

Associated Practices: Nutrient management (590)

Before Situation:

The producer is feeding animals a single diet with a higher nutrient levels than are needed to meet National Research Council (NRC) recommendations for animals of this type and at this stage of production.

After Situation:

This scenario's operation currently houses 15,000 broilers with an average weight of 5 pounds, or 75 animal units ((15,000 broilers * 5lbs/chicken/1000 lbs/) = 75 AU). A baseline analysis of manure and feed will be completed to determine the current nutrient inputs and outputs. The producer will reduce feed protein and phosphorus levels to that of NRC recommendations for animals of this type and at this stage of production. Producer will consider alternative feedstuffs, phase feeding, split-sex feeding and other scenarios to achieve the objective. Proper feed management removes excess nutrients from the manure, making the manure easier for the producer to properly manage within his/her land constraints. The improved manaure management prevents surface and groundwater degredation from excess nitrogen and phosphorus.

Scenario Feature Measure: Number of 1000 pound animal units

Scenario Unit: Animal Unit

Scenario Typical Size: 75

Scenario Cost: $1,709.21 **Scenario Cost/Unit:** $22.79

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	15	$467.85
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.81	8	$166.48
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	8	$756.72
Materials						
Test, Manure Analysis	306	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$45.49	4	$181.96
Test, Feed Analysis	1989	Representative sample of feed. Includes materials and shipping only.	Each	$34.05	4	$136.20

Practice: 595 - Integrated Pest Management

Scenario: #1 - Basic IPM Field 1RC

Scenario Description:

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Field/Forage Crops to address one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

After Situation:

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for one identified rresource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Scenario Feature Measure: Acres of Implementation

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: $440.74 **Scenario Cost/Unit:** $11.02

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	2	$62.38
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	4	$378.36

Practice: 595 - Integrated Pest Management

Scenario: #2 - Basic IPM Field >1RC

Scenario Description:

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Field/Forage Crops to address multiple identified resource concerns (e.g. Water Quality – Impacts to Human Drinking Water and Pollinator Impacts) with either risk prevention (e.g. planned pesticides have no risks to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to two or more identified resource concerns (e.g. Water Quality – Impacts to Human Drinking Water and Impacts on Pollinators).

After Situation:

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for two or more identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Impacts on Pollinators) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Scenario Feature Measure: Acres of Implementation

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: $661.11 **Scenario Cost/Unit:** $16.53

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	6	$567.54
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	3	$93.57

Practice: 595 - Integrated Pest Management

Scenario: #3 - Advanced IPM Field All RCs

Scenario Description:

A comprehensive IPM plan with LGU-approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied in Large Scale Field/Forage Crops to address all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

After Situation:

After implementing the 595 practice, a comprehensive IPM plan with Land Grant University approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied to help meet the minimum criteria for all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Scenario Feature Measure: Acres of Implementation

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: $1,259.84 **Scenario Cost/Unit:** $31.50

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	12	$1,135.08
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	4	$124.76

Practice: 595 - Integrated Pest Management

Scenario: #4 - Basic IPM Fruit/Veg 1RC

Scenario Description:

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Small Fruit/Vegetable Crops to address one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

After Situation:

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for at least one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Scenario Feature Measure: Acres of Implementation

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: $752.64 **Scenario Cost/Unit:** $75.26

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	4	$378.36
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	12	$374.28

Practice: 595 - Integrated Pest Management

Scenario: #5 - Basic IPM Fruit/Veg >1RC

Scenario Description:

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Small Fruit/Vegetable Crops to address multiple identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Pollinator Impacts) with either risk prevention (e.g. planned pesticides have no risk to identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to two or more identified resource concerns (e.g. Water Quality – Impacts to Human Drinking Water and Impacts on Pollinators).

After Situation:

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for two or more identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Impacts on Pollinators) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Scenario Feature Measure: Acres of Implementation

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: $1,634.12 **Scenario Cost/Unit:** $163.41

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	16	$499.04
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	12	$1,135.08

Practice: 595 - Integrated Pest Management

Scenario: #6 - Advanced IPM Fruit/Veg All RCs

Scenario Description:

A comprehensive IPM plan with LGU-approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied in Large Scale Small Fruit/Vegetable Crops to address all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

After Situation:

After implementing the 595 practice, a comprehensive IPM plan with Land Grant University approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied to help meet the minimum criteria for all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Scenario Feature Measure: Acres of Implementation

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: $2,262.00 **Scenario Cost/Unit:** $226.20

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	24	$748.56
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	16	$1,513.44

Practice: 595 - Integrated Pest Management

Scenario: #7 - Basic IPM Orchard 1RC

Scenario Description:

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Orchard/Specialty Crops to address one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

After Situation:

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for at least one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Scenario Feature Measure: Acres of Implementation

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: $1,823.30 **Scenario Cost/Unit:** $182.33

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	16	$499.04
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	14	$1,324.26

Practice: 595 - Integrated Pest Management

Scenario: #8 - Basic IPM Orchard >1RC

Scenario Description:

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Orchard/Specialty Crops to address multiple identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Pollinator Impacts) with either risk prevention (e.g. planned pesticides have no risks to identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to two or more identified resource concerns (e.g. Water Quality – Impacts to Human Drinking Water and Impacts on Pollinators).

After Situation:

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for two or more identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Impacts on Pollinators) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Scenario Feature Measure: Acres of Implementation

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: $2,137.24 **Scenario Cost/Unit:** $213.72

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	20	$623.80
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	16	$1,513.44

Practice: 595 - Integrated Pest Management

Scenario: #9 - Advanced IPM Orchard All RCs

Scenario Description:

A comprehensive IPM plan with LGU-approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied in Large Scale Orchard/Specialty Crops to address all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

After Situation:

After implementing the 595 practice, a comprehensive IPM plan with Land Grant University approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied to help meet the minimum criteria for all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Scenario Feature Measure: Acres of Implementation

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: $2,511.52 **Scenario Cost/Unit:** $251.15

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	16	$1,513.44
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	32	$998.08

Practice: 595 - Integrated Pest Management

Scenario: #10 - IPM S-Farm 1RC

Scenario Description:

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Small Farm/Diversified Systems (e.g. CSA, organic, etc.) to address one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings). This scenario attempts to capture the higher cost/acre of planning and implementing IPM techniques on smaller acreages with very diverse cropping systems. This scenario describes implementation of 595 on an operation generally less than 100 acres and accounts for the economy of scale on a smaller operation with the unit of "each."

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

After Situation:

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for at least one identified resource concern resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Scenario Feature Measure: Total Farm

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $627.88 **Scenario Cost/Unit:** $627.88

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	4	$378.36
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	8	$249.52

Practice: 595 - Integrated Pest Management

Scenario: #11 - IPM S-Farm >1RC

Scenario Description:

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Small Farm/ Diversified Systems (e.g. CSA, organic, etc.) to address multiple identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Pollinator Impacts) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings). This scenario attempts to capture the higher cost/acre of planning and implementing IPM techniques on smaller acreages with very diverse cropping systems. This scenario describes implementation of 595 on an operation generally less than 100 acres and accounts for the economy of scale on a smaller operation with the unit of "each."

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to two or more identified resource concerns (e.g. Water Quality – Impacts to Human Drinking Water and Impacts on Pollinators).

After Situation:

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for two or more identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Impacts on Pollinators) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Scenario Feature Measure: Total Farm

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $1,066.58 **Scenario Cost/Unit:** $1,066.58

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	16	$499.04
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	6	$567.54

Practice: 595 - Integrated Pest Management

Scenario: #12 - Advanced IPM S-Farm All RCs

Scenario Description:

A comprehensive IPM plan with LGU-approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied in Small Farm/Diversified Systems (e.g. CSA, Organic, etc.) to address all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings. This scenario attempts to capture the higher cost/acre of planning and implementing IPM techniques on smaller acreages with very diverse cropping systems. This scenario describes implementation of 595 on an operation generally less than 100 acres and accounts for the economy of scale on a smaller operation with the unit of "each."

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

After Situation:

After implementing the 595 practice, a comprehensive IPM plan with Land Grant University approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied to help meet the minimum criteria for all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

Scenario Feature Measure: Total Farm

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: $2,511.52 **Scenario Cost/Unit:** $2,511.52

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	32	$998.08
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	16	$1,513.44

Practice: 595 - Integrated Pest Management

Scenario: #13 - Risk Prevention IPM All RCs

Scenario Description:

A comprehensive IPM plan based primarily on LGU-approved pest prevention and avoidance techniques is applied to prevent negative impacts on all identified resource concerns. LGU-approved pest monitoring techniques and pest thresholds may also be included, but suppression techniques cannot pose any hazards to identified resource concerns. This type of system is very difficult to achieve, but may be most commonly achieved in Organic Systems that already rely heavily on prevention and avoidance techniques.

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).

After Situation:

After implementing the 595 practice, a comprehensive IPM plan based primarily on Land Grant University approved pest prevention and avoidance techniques is applied to prevent negative impacts on all identified resource concerns. Land Grant University approved pest monitoring techniques and pest thresholds may also be included, but suppression techniques cannot pose any hazards to identified resource concerns.

Scenario Feature Measure: Acres of Implementation

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: $1,413.75 **Scenario Cost/Unit:** $141.38

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$31.19	15	$467.85
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$94.59	10	$945.90