

Practice: 587 - Structure for Water Control

Scenario: #3 - Commercial Inline Flashboard Riser

Scenario Description: An Inline Water Control Structure (WCS) composed of plastic that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concern: Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at point along a pipe extending through an embankment, providing ease of access to the structure and provide better protection against beaver activity. There are commercially available models composed of plastic that are commonly used when the width of the is 24" or less. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a using a such a commercial product. The typical scenario is an inline structure with a width of 20", height of six feet, The pipe is 50' of 15" SCH 40 PVC (inlet and outlet combined). Associated Practices: Critical Area Planting (342), 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.

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).

Scenario Feature Measure: Flashboard Weir Length (in) x Barrel Length (ft)

Scenario Unit: Inch-Foot

Scenario Typical Size: 1000

Total Scenario Cost: \$4,362.32

Scenario Cost/Unit: \$4.36

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$5.91	15	\$88.58
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.48	190	\$850.48
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	\$69.50	2	\$139.00

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	\$30.82	2	\$61.64
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.19	8	\$177.55
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$34.38	3	\$103.14

Materials

Pipe, PVC, 16", SCH 80	1353	Materials: - 16" - PVC - SCH 80 - ASTM D1785	Foot	\$42.94	50	\$2,146.97
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	\$312.56	1	\$312.56
Water Control Structure, Stoplog, Inline, variable cost portion	2146	Variable cost portion of a Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Calculate total variable costs by multiplying by the structure height x pipe diameter. Materials only.	Height x Diameter	\$12.08	10	\$120.75

Mobilization

Mobilization, medium	1139	Equipment with 70-150 HP or typical weights between 14,000 and	Each	\$283.39	1	\$283.39
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equipment		30,000 pounds.				
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	\$78.25	1	\$78.25

Practice: 587 - Structure for Water Control

Scenario: #4 - Culvert <30 inches HDPE

Scenario Description: Install a new HDPE culvert under 30 inches in diameter to convey water under roads or other barriers. A typical scenario would be an 24 inch diameter pipe, 40 feet in length. Work includes site preparation, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and riprap protection of side slopes. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic. Use (578) Stream Crossing for culverts 30 inches or perennial flow. Associated practices: Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).

Before Situation: Water flow needs to be conveyed under an access road, ditch or other barrier. Water must be conveyed in a controlled fashion.

After Situation: Water is conveyed in a controlled manner.

Scenario Feature Measure: Pipe Diameter (In) x Pipe Length (Ft)

Scenario Unit: Inch-Foot

Scenario Typical Size: 960

Total Scenario Cost: \$2,702.38

Scenario Cost/Unit: \$2.81

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$32.13	5	\$160.64
Pipe, HDPE, CPT, Double Wall, Soil Tight, 24"	1246	Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	\$18.89	40	\$755.45
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$76.60	2	\$153.20

Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$5.91	45	\$265.75
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.37	5	\$11.84

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.19	10	\$221.94
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	4	\$1,133.55
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Practice: 587 - Structure for Water Control

Scenario: #5 - Culvert <30 inches CMP

Scenario Description: Install a new Corrugated Metal Pipe (CMP) culvert under 30 inches in diameter to convey water under roads or other barriers. A typical scenario would be an 24 inch diameter pipe, 40 feet in length. Work includes site preparation, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and riprap protection of side slopes. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic. Use (578) Stream Crossing instead for culverts 30 inches or perennial flow. Associated practices: Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).

Before Situation: Water flow needs to be conveyed under an access road, ditch or other barrier. Water must be conveyed in a controlled fashion.

After Situation: Water is conveyed in a controlled manner.

Scenario Feature Measure: Pipe Diameter (In) x Pipe Length (Ft)

Scenario Unit: Inch-Foot

Scenario Typical Size: 960

Total Scenario Cost: \$3,105.01

Scenario Cost/Unit: \$3.23

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$32.13	5	\$160.64
Pipe, CMP, 24", 12 Gauge	1417	24" Corrugated Metal Pipe, Galvanized, Uncoated, 12 gage. Material cost only.	Foot	\$28.95	40	\$1,158.08
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$76.60	2	\$153.20

Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$5.91	45	\$265.75
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.37	5	\$11.84

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.19	10	\$221.94
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	4	\$1,133.55
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Practice: 587 - Structure for Water Control

Scenario: #6 - Trench Drain with grate

Scenario Description: This involves installing a concrete cross drain with grate to collect and redirect surface away from another practice to reduce volume of nutrient materials to be collected. Typically used up gradient of a heavy use area and/or waste storage facility. Associated practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area (561), Roof Runoff Structure (558), Underground Outlet (620) Waste Storage Facility (313), Waste Transfer (634), Solid/Liquid Waste Separation Facility (632)

Before Situation: Upsite surface water adding additional volume to existing heavy use area or waste storage facility.

After Situation: Install a 12' long 1" wide by 18" deep concrete box to direct runoff away from existing HUA.

Scenario Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$1,756.46

Scenario Cost/Unit: \$1,756.46

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$62.09	4	\$248.37
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-place in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$429.82	1.2	\$515.79

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$32.13	0.5	\$16.06
Welded Bar Grate, metal	1980	Heavy duty vertical bar welded grating, typically 1-1/4"x 3/16" bars on 1" spacing with cross rod on 4" spacing. Materials only.	Square Foot	\$13.55	15	\$203.18

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	\$34.38	6	\$206.28
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
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Practice: 587 - Structure for Water Control

Scenario: #7 - Water Bar

Scenario Description: This scenario is the installation of a permanent water bar to direct water off an existing animal trail or access road. Installation of water bars on new animal trails or access roads is covered by that practice. This scenario assists in addressing the resource concerns: water management. Associated Practices: Animal Trails Walkways (575), Access road(560), Diversion (362), Grass Waterway (412)

Before Situation: Surface water flowing down associated practice causing scouring or installation avoids same situation.

After Situation: Three water bars are installed at intervals as per standard. Construction involved reshaping existing site, rolling sub-base, and placing compacted gravel surface at an angle across the associated practice. Other options include buried industrial belting on edge or two timber buried with spacer for water flow. Typical situation is a spacing of 300 per feet over 1000 feet of roadway.

Scenario Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 3

Total Scenario Cost: \$2,467.83

Scenario Cost/Unit: \$822.61

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$32.13	28	\$899.58
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Equipment Installation

Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.48	1	\$4.48
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hour	\$97.66	3	\$292.98

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$30.82	3	\$92.46
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$44.78	1	\$44.78

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	4	\$1,133.55
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Practice: 587 - Structure for Water Control

Scenario: #8 - Grated Dropbox

Scenario Description: This involves installing a concrete box with grate to collect and redirect surface water away from another practice to reduce volume of nutrient materials to be collected or to prevent surface erosion. Typically used up gradient of a heavy use area and/or waste storage facility. Associated practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area (561), Roof Runoff Structure (558), Underground Outlet (620) Waste Storage Facility (313), Waste Transfer (634), Solid/Liquid Waste Separation Facility (632)

Before Situation: Upsite surface water causing downslope erosion or adding cleanwater to nutrient rich areas.

After Situation: Install 2'x4'x4' deep concrete box with grate to collect surface water.

Scenario Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$1,369.95

Scenario Cost/Unit: \$1,369.95

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$32.13	0.4	\$12.85
Catch Basin, concrete, 2'x2'x6'	1257	Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor.	Each	\$669.31	1	\$669.31

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$24.55	1	\$24.55
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$34.38	1	\$34.38

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	\$62.09	1	\$62.09
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
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Practice: 587 - Structure for Water Control

Scenario: #9 - Slide Gate

Scenario Description: This scenario is the installation of a permanent slide gate structure to control the conveyance of water. The typical size is a 4' diameter opening. The slide gate may be installed on an open channel or pipeline. The slide gate is made of steel and has a hand operated mechanical lifting system, i.e. screw. This scenario assists in addressing the resource concerns: water management. Associated Practices: 533-Pumping Plant.

Before Situation: A channel or pipeline is in need of a head gate to control the flow of water.

After Situation: A 4' slide gate is installed and operated by hand is installed.

Scenario Feature Measure: diameter

Scenario Unit: Foot

Scenario Typical Size: 4

Total Scenario Cost: \$8,459.55

Scenario Cost/Unit: \$2,114.89

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$30.82	6	\$184.93
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.19	12	\$266.33
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$34.38	12	\$412.56

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	\$62.09	6	\$372.55
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
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Materials

Screw gate, cast iron, 4' diameter, 10/0 head	1746	4' diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Includes materials only.	Each	\$6,656.40	1	\$6,656.40
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Practice: 587 - Structure for Water Control

Scenario: #10 - Flap Gate

Scenario Description: This scenario is the installation of a permanent flap (tide) gate structure to control the direction of flow resulting from tides or high water or back-flow from flooding. The typical size is a 4' diameter opening. The gate may be installed on an open channel or pipeline. It is made of steel and operates automatically. This scenario assists in addressing the resource concerns: water management. Associated practices: Shallow water development and management (646), Wetland Wildlife Habitat Management (644)

Before Situation: A wetland or other area is in need of a flap gate to control the direction of the water.

After Situation: A flap gate 4' wide is installed.

Scenario Feature Measure: Feet Diameter (of Gate)

Scenario Unit: Foot

Scenario Typical Size: 4

Total Scenario Cost: \$7,369.65

Scenario Cost/Unit: \$1,842.41

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$30.82	6	\$184.93
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.19	12	\$266.33
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$34.38	12	\$412.56

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	\$62.09	6	\$372.55
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
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Materials

Flap Gate, cast iron, 4' diameter	1745	4' diameter cast iron flap gate. Materials only.	Each	\$5,566.50	1	\$5,566.50
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Practice: 587 - Structure for Water Control

Scenario: #11 - Flap Gate w/ Concrete Wall

Scenario Description: Install a concrete cut off wall with tide gate at the outlet of a channel. A typical scenario would be installed in a 25 foot channel, 6 foot deep, with 2:1 side slopes. A concrete wall will extend 10 feet on each side, and include a 4' flap gate structure to control flooding. Work includes site preparation, forming and pouring concrete, backfilling and acquiring and installing the tide gate.

Before Situation: Tides or flooding inundate and affect water quality of wetlands or other managed systems.

After Situation: Tide or flood inundation is controlled. Associated practices could be Aquaculture Ponds (397), Aquatic Organism Passage (396), Bivalve Aquaculture Gear and Biofouling Control (400), Constructed Wetland (656), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Field Ditch (388), Irrigation System, Surface and Subsurface (443), Irrigation Water Management (449), Salinity and Sodic Soil Management (610), Subsurface Drain (606), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), Wetland Creation (658), Wetland Enhancement (659), Wetland Restoration (657), and Wetland Wildlife Habitat Management (644).

Scenario Feature Measure: Cubic Yards of Concrete

Scenario Unit: Cubic Yard

Scenario Typical Size: 10

Total Scenario Cost: \$12,516.21

Scenario Cost/Unit: \$1,251.62

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$429.82	10	\$4,298.24
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.48	200	\$895.24
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	\$2.37	200	\$473.70

Materials

Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.70	4	\$126.79
Flap Gate, cast iron, 4' diameter	1745	4' diameter cast iron flap gate. Materials only.	Each	\$5,566.50	1	\$5,566.50

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.19	1	\$22.19
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	4	\$1,133.55
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Practice: 587 - Structure for Water Control

Scenario: #12 - Rock Checks for Water Surface Profile

Scenario Description: Typical setting is in a stream that has become incised and is therefore disconnected from the floodplain. Typical installation consists of installing a "Vee" shaped rock structures with points facing upstream for the purpose of raising the water surface profile. Cost estimate is for three check dams with a top width of 3', max height of 6', min height of 3', and 28' length; containing an average of 58 cubic yards or 29 tons of rock for a total of 87 tons. The check dams are underlain with geotextile fabric. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as water quality degradation and soil erosion-concentrated flow erosion. Associated Practices: Critical Area Planting (342), Streambank and Shoreline Protection (580), Channel Bed Stabilization (584), Stream Habitat Improvement and Management (395), and Wetland Wildlife Habitat Management (644) will use the corresponding Standard(s) as appropriate.

Before Situation: The stream presently is incised with near vertical banks caused by bank toe erosion and sloughing. This condition has caused the floodplains to be disconnected from the stream, with only floods well above normal high-water escaping the high banks of the stream.

After Situation: Banks are stabilized, and pools are created raising the Water Surface Profile elevation and effectively reducing the slope. Riffle pool scheme is restored and banks are protected. Water quality is protected downstream due to erosion protection, and wetland features are restored in the floodplain. Any needed re-vegetation of disturbed areas use Critical Area Planting (342).

Scenario Feature Measure: Tons of rock installed

Scenario Unit: Ton

Scenario Typical Size: 87

Total Scenario Cost: \$5,774.36

Scenario Cost/Unit: \$66.37

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$76.60	57	\$4,366.31
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.19	8	\$177.55
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$541.06	2	\$1,082.13
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Equipment Installation

Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	\$1.77	84	\$148.37
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Practice: 587 - Structure for Water Control

Scenario: #13 - In-Stream Structure for Water Surface Profile

Scenario Description: Typical setting is in a stream that has become incised and is therefore disconnected from the floodplain. Typical installation consists of installing a "Vee" shaped concrete structure which points facing upstream for the purpose of raising the water surface profile. Cost estimate is for one cross vane with a effective length (Streambed width) of 36', and total length of 65', effective height of 3', max height of 6', and a 3' by 1.5' footer; containing 19 cubic yards of Concrete. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as water quality degradation and soil erosion-concentrated flow erosion. Associated Practices: Critical Area Planting (342), Streambank and Shoreline Protection (580) Channel Bed Stabilization (584), Stream Habitat Improvement and Management (395), and Wetland Wildlife Habitat Management (644) will use the corresponding Standard(s) as appropriate.

Before Situation: The stream presently is incised with near vertical banks caused by bank toe erosion and sloughing. This condition has caused the floodplains to be disconnected from the stream, with only floods well above normal high-water escaping the high banks of the stream.

After Situation: Banks are stabilized, and pools are created raising the water surface elevation and effectively reducing the slope. Riffle pool scheme is restored and banks are protected. Water quality is protected downstream due to erosion protection, and wetland features are restored in the floodplain. Any needed re-vegetation of disturbed areas use Critical Area Planting (342).

Scenario Feature Measure: Streambed Width

Scenario Unit: Foot

Scenario Typical Size: 36

Total Scenario Cost: \$10,213.16

Scenario Cost/Unit: \$283.70

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$429.82	19	\$8,166.66
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	\$2.37	18	\$42.63
Water management, Flooding &dewatering	969	Includes equipment and power unit. Labor not included.	Acre Foot	\$229.86	1	\$229.86

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.19	10	\$221.94
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$44.78	7	\$313.44

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	\$541.06	2	\$1,082.13
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	\$78.25	2	\$156.51

Practice: 587 - Structure for Water Control

Scenario: #20 - Gated Pipe

Scenario Description: This involves spreading water to prevent surface erosion. Typically stormwater or water that may have extremely low levels of nutrients or small solids. Distribution above an existing grassed area. If the water has definable nutrients, use the Vegetated Treatment Area standard. Associated practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area (561), Roof Runoff Structure (558), Underground Outlet (620) Waste Storage Facility (313), Waste Transfer (634), Solid/Liquid Waste Separation Facility (632)

Before Situation: Surface water flowing down associated practice causing scouring or installation avoids same situation.

After Situation: Install 200 LF of 6" gated/perforated pipe to distribute water in an existing grassed area.

Scenario Feature Measure: Length of pipe

Scenario Unit: Foot

Scenario Typical Size: 200

Total Scenario Cost: \$2,916.77

Scenario Cost/Unit: \$14.58

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Block, concrete	253	Concrete block, hollow, normal weight, 3500 psi. Includes both full and partial sizes. Material only	Each	\$1.63	25	\$40.70
Pipe, PVC, 6", SDR 35	993	Materials: - 6" - PVC - SDR 35 - ASTM D3034	Foot	\$4.45	200	\$890.18
Post, Wood, CCA treated, 4" x 8'	10	Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only.	Each	\$8.06	13	\$104.79

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$24.55	8	\$196.36
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	\$34.38	16	\$550.09
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$44.78	8	\$358.21

Equipment Installation

Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$49.40	8	\$395.24
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Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$190.60	2	\$381.20
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Practice: 587 - Structure for Water Control

Scenario: #21 - Sprinkler gun

Scenario Description: This involves spreading water to prevent surface erosion. Typically stormwater or water that may have extremely low levels of nutrients or small solids. Distribution is on a site that is not typically down hill from source or is not contoured for other methods of distribution on an existing grassed area. Method used are one or more large sprinkler guns. Cost per gun includes piping between guns. If the water has definable nutrients, use the Vegetated Treatment Area standard. Associated practices: Heavy Use Area (561), Roof Runoff Structure (558), Underground Outlet (620), Solid/Liquid Waste Separation Facility (632)

Before Situation: Surface water flowing down associated practice causing scouring or installation avoids same situation.

After Situation: Three sprinkler pods are installed and piped together to spray water over an existing grassed area.

Scenario Feature Measure: Number of guns

Scenario Unit: Each

Scenario Typical Size: 3

Total Scenario Cost: \$2,253.70

Scenario Cost/Unit: \$751.23

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.39	160	\$222.04
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Labor

Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$34.38	3	\$103.14
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$44.78	1	\$44.78

Materials

Irrigation, Pod System, w/Appurtenances	323	Pod irrigation system that includes pod, pipe, sprinklers, connections, and appurtenances. Includes materials only.	Each	\$247.57	3	\$742.71
Pipe, PVC, 4", SDR 21	986	Materials: - 4" - PVC - SDR 21 200 psi - ASTM D2241	Foot	\$3.59	160	\$574.26

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
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Practice: 587 - Structure for Water Control

Scenario: #283 - Forestland Waterbar

Scenario Description: This scenario is utilized for the installation of permanent water bars to direct water off an existing forest trail or access road to correct an existing soil erosion problem. Installation of water bars on new forest trails (655) is not covered by this practice scenario. This scenario is installed into existing soils, using a small to medium sized dozer with an angle blade. All disturbed soils are seeded down with an acceptable shade tolerant grass (or Grass/Legume) seed mix using NRCS CPS 342, Critical Area Planting.

Before Situation: Sloping forest trail carries excessive runoff during rainfall events resulting in erosion of the trail and transport of soil and sediment to nearby water bodies.

After Situation: Properly seeded waterbars direct runoff away from trail.

Scenario Feature Measure: Waterbar

Scenario Unit: Each

Scenario Typical Size: 5

Total Scenario Cost: \$856.05

Scenario Cost/Unit: \$171.21

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$24.55	2.5	\$61.36
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$44.78	1	\$44.78

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	\$73.26	2.5	\$183.14
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
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Practice: 587 - Structure for Water Control

Scenario: #284 - Basin, earthen

Scenario Description: An earth embankment constructed across the upper end of a water course to redirect flow into an inlet or riser connected to a existing or new underground outlet. Typical top width 4' with an inside slope of 2:1 and an outside slope of 5:1 or flatter. Typical depth from 2 to 6' with the length of fill from 20 to 60'. The purpose is to facilitate flow redirection and allow some collection of trash and sediment. Associated Practices: Critical Area Planting (342), Underground Outlet (620) lined waterway or outlet (468) Mulching (484)

Before Situation: Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over time. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport. Resource concern addressed includes soil erosion and water quality by trapping trash and/or reduce erosion in a field to protect riparian areas and water bodies from sediment deposition. Surface water causes erosion and the sediment (and potentially pesticides) to be transported into the riparian areas and water bodies downstream.

After Situation: A 35 foot long embankment is constructed with CY of excavation/earthfill to build an earthen basin. Rill and/or gully erosion is reduced. Water is redirected into underground piping system. Part of system to protect grassed waterway.

Scenario Feature Measure: Length of embankment

Scenario Unit: Linear Foot

Scenario Typical Size: 35

Total Scenario Cost: \$1,138.53

Scenario Cost/Unit: \$32.53

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$137.39	4	\$549.55
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	1	\$283.39
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$30.82	4	\$123.29
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$34.38	4	\$137.52
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	\$44.78	1	\$44.78