

**Practice: 578 - Stream Crossing**

**Scenario: #1 - Bridge**

**Scenario Description:**

Install a bridge to allow stream flows to cross under access road or animal trail. Bridge opening determined by sizing for storm event dictated in standard. Scenario includes dewatering, abutments, girders, decking. Work consists of site preparation, dewatering, acquiring and installing abutments, girders, decking with necessary hardware, backfilling abutments, and armoring with geotextile and riprap. Riprap and geotextile are used to stabilize and protect abutments as needed. Scenario based on cast in place concrete abutments, steel girders, and timber deck. Travel surface shall be wooden deck surface. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Span is less than 14 feet. Load is H-20. Width is 14 feet including curbs. Abutments are <= 6 feet. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

**Before Situation:**

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

**After Situation:**

Access and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Scenario Feature Measure:** square footage of bridge deck

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 252

**Scenario Cost:** \$10,208.63

**Scenario Cost/Unit:** \$40.51

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$97.17	8	\$777.36
Excavation, common earth, side cast, large equipment	1227	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$1.83	75	\$137.25
<b>Labor</b>						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$28.44	80	\$2,275.20
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	\$24.95	8	\$199.60
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$22.40	20	\$448.00
Dimension Lumber, untreated	1045	Untreated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners.	Board Foot	\$0.73	2000	\$1,460.00
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft, includes installation and delivery.	Cubic Yard	\$112.35	18	\$2,022.30
Steel, structural steel members	1779	Structural steel, includes materials and fabrication.	Pound	\$0.98	1500	\$1,470.00
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$58.01	20	\$1,160.20
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.72	1	\$258.72

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**Scenario: #2 - 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. 48 inch Culvert installation with > 75 cy of fill needed and > 2 yds rock riprap for headwalls. Pipe is 50 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 could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways.

**Scenario Feature Measure:** Culvert

**Scenario Unit:** Diameter Inch Foot

**Scenario Typical Size:** 2,400

**Scenario Cost:** \$6,143.35

**Scenario Cost/Unit:** \$2.56

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
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	\$114.46	10	\$1,144.60
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.03	3	\$15.09
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.82	460	\$1,757.20
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$24.95	22	\$548.90
<b>Materials</b>						
Pipe, CMP, 48", 14 Gauge	1280	48" Corrugated Metal Pipe, Galvanized, Uncoated, 14 gage. Material cost only.	Foot	\$29.28	50	\$1,464.00
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$58.01	12	\$696.12
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.72	2	\$517.44

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**Scenario: #3 - Hard Armored, rock low-water crossing**

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using rock riprap. This scenario includes site preparation, dewatering, acquiring and installing gravel or geotextile with rock riprap on channel bottom and approaches. Final travel surface shall be rock. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 75 foot bottom width and approaches. Width is 12 feet for a total area as 900 square feet. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

**Before Situation:**

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

**After Situation:**

Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Scenario Feature Measure:** Crossing dimensions

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 900

**Scenario Cost:** \$3,498.14

**Scenario Cost/Unit:** \$3.89

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$97.17	4	\$388.68
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	\$1.83	40	\$73.20
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$24.95	4	\$99.80
<b>Materials</b>						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$58.01	41.7	\$2,419.02
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.72	2	\$517.44

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**Scenario: #4 - Hard Armored, concrete low-water crossing**

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using concrete in place. This scenario includes site preparation, dewatering, acquiring and installing cast in place concrete on channel bottom and approaches. Final travel surface shall be concrete. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 50 foot bottom width and 8 foot approach on each side. Width is 12 feet for a total area of 792 square feet. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

**Before Situation:**

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

**After Situation:**

Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Scenario Feature Measure:** Crossing dimensions

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 600

**Scenario Cost:** \$4,129.61

**Scenario Cost/Unit:** \$6.88

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
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	\$170.90	17.1	\$2,922.39
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$97.17	4	\$388.68
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	\$1.83	110	\$201.30
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$24.95	4	\$99.80
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.72	2	\$517.44