

## Scenario Worksheet

## Practice and Scenario Description:

Information Type	Data
Region	Southern Plains
State	Oklahoma
Discipline Group	Agricultural Engineering
Practice Code/Name	561 - Heavy Use Area Protection
Scenario ID	1
Scenario Name	Rock/Gravel
Scenario Description	The stabilization of areas around facilities that are frequently and intensively used by livestock by surfacing with rock and or gravel on a stable earthen base material 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 Practice Situation	The soil surface around stationary livestock watering facilities, hay rings, feeding troughs, mineral boxes and/or other facilities have become highly disturbed and have little to no vegetation to stabilize the soil surface, due to the frequency and intensity of use by livestock. As a result, soil erosion and animal health are resource concerns that need to be addressed.
After Practice Situation	The soil surface around stationary livestock watering facilities, hay rings, feeding troughs, mineral boxes and/or other facilities has been stabilized with rock placed on a stable earthen base material to provide a non-eroding, well drained, skid resistant surface to reduce soil transport and to prevent animal health and injury concerns. A typical design would require approximately 640 square feet (12 cubic yards) of rock and or gravel on approximately 84 square yards of geotextile fabric foundation material.
Scenario Feature Measure	Surface Area
Scenario Unit	Square Foot
Scenario Typical Size	640

## Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$215.52	\$0.34
Equipment/Installation	\$87.51	\$0.14
Labor	\$60.03	\$0.09
Mobilization	\$86.90	\$0.14
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$449.96	\$0.70

## Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	\$17.96	12	\$215.52
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$29.17	3	\$87.51
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$20.01	3	\$60.03
Mobilization	1138	Mobilization, small equipment	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	\$86.90	1	\$86.90

## Scenario Worksheet

## Practice and Scenario Description:

Information Type	Data
Region	Southern Plains
State	Oklahoma
Discipline Group	Agricultural Engineering
Practice Code/Name	561 - Heavy Use Area Protection
Scenario ID	2
Scenario Name	Rock/Gravel on Geotextile
Scenario Description	The stabilization of areas around facilities that are frequently and intensively used by livestock by surfacing with rock and or gravel on a geotextile fabric 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 Practice Situation	The soil surface around stationary livestock watering facilities, hay rings, feeding troughs, mineral boxes and/or other facilities have become highly disturbed and have little to no vegetation to stabilize the soil surface, due to the frequency and intensity of use by livestock. As a result, soil erosion and animal health are resource concerns that need to be addressed.
After Practice Situation	The soil surface around stationary livestock watering facilities, hay rings, feeding troughs, mineral boxes and/or other facilities has been stabilized with rock placed on geotextile fabric to provide a non-eroding, well drained, skid resistant surface to reduce soil transport and to prevent animal health and injury concerns. A typical design would require approximately 640 square feet (12 cubic yards) of rock and or gravel on approximately 84 square yards of geotextile fabric foundation material.
Scenario Feature Measure	Surface Area
Scenario Unit	Square Foot
Scenario Typical Size	640

## Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$554.88	\$0.87
Equipment/Installation	\$87.51	\$0.14
Labor	\$95.79	\$0.15
Mobilization	\$86.90	\$0.14
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$825.08	\$1.29

## Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	\$17.96	12	\$215.52
Materials	1210	Geotextile, non-woven, heavy weight	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials only.	Square Yard	\$4.04	84	\$339.36
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$29.17	3	\$87.51
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$20.01	3	\$60.03
Labor	231	General Labor	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	\$17.88	2	\$35.76
Mobilization	1138	Mobilization, small equipment	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	\$86.90	1	\$86.90

## Scenario Worksheet

## Practice and Scenario Description:

Information Type	Data
Region	Southern Plains
State	Oklahoma
Discipline Group	Agricultural Engineering
Practice Code/Name	561 - Heavy Use Area Protection
Scenario ID	3
Scenario Name	Rock/Gravel-GeoCell-Geotextile
Scenario Description	The stabilization of areas around facilities that are frequently and intensively used by livestock by surfacing with rock and or gravel confined in cellular containment grid on a geotextile fabric 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 Practice Situation	The soil surface around stationary livestock watering facilities, hay rings, feeding troughs, mineral boxes and/or other facilities have become highly disturbed and have little to no vegetation to stabilize the soil surface, due to the frequency and intensity of use by livestock. As a result, soil erosion and animal health are resource concerns that need to be addressed.
After Practice Situation	The soil surface around stationary livestock watering facilities, hay rings, feeding troughs, mineral boxes and/or other facilities has been stabilized with rock placed in cellular containment grid on geotextile fabric to provide a non-eroding, well drained, skid resistant surface to reduce soil transport and to prevent animal health and injury concerns. A typical design would require approximately 640 square feet (12 cubic yards) of rock and or gravel on approximately 84 square yards of geotextile fabric foundation material.
Scenario Feature Measure	Surface Area
Scenario Unit	Square Foot
Scenario Typical Size	640

## Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$554.88	\$0.87
Equipment/Installation	\$978.15	\$1.53
Labor	\$167.31	\$0.26
Mobilization	\$86.90	\$0.14
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$1,787.24	\$2.79

## Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	\$17.96	12	\$215.52
Materials	1210	Geotextile, non-woven, heavy weight	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials only.	Square Yard	\$4.04	84	\$339.36
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$29.17	3	\$87.51
Equipment/Installation	1054	GeoCell, 4"	Polymer 3-D cellular grid 4" deep that is filled with stone or earth. Includes materials, labor and equipment for the geocell only, does not include backfill.	Square Yard	\$12.37	72	\$890.64
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$20.01	3	\$60.03
Labor	231	General Labor	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	\$17.88	6	\$107.28
Mobilization	1138	Mobilization, small equipment	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	\$86.90	1	\$86.90

## Scenario Worksheet

## Practice and Scenario Description:

Information Type	Data
Region	Southern Plains
State	Oklahoma
Discipline Group	Agricultural Engineering
Practice Code/Name	561 - Heavy Use Area Protection
Scenario ID	4
Scenario Name	Reinforced Concrete with sand or gravel foundation
Scenario Description	The stabilization of areas around facilities that are frequently and intensively used by livestock by surfacing with reinforced concrete on a sand or 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 Practice Situation	The soil surface around stationary livestock watering facilities, hay rings, feeding troughs, mineral boxes and/or other facilities have become highly disturbed and have little to no vegetation to stabilize the soil surface, due to the frequency and intensity of use by livestock. As a result, soil erosion and animal health are resource concerns that need to be addressed.
After Practice Situation	The soil surface around stationary livestock watering facilities, hay rings, feeding troughs, mineral boxes and/or other facilities has been stabilized with wire mesh reinforced concrete to provide a non-eroding, well drained, skid resistant surface to reduce soil transport and to prevent animal health and injury concerns. A typical design would require approximately 640 square feet (12 cubic yards) of welded wire mesh reinforced concrete placed on a sand or gravel base.
Scenario Feature Measure	Surface Area
Scenario Unit	Square Foot
Scenario Typical Size	640

## Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$183.52	\$0.29
Equipment/Installation	\$1,277.20	\$2.00
Labor	\$0.00	\$0.00
Mobilization	\$86.90	\$0.14
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$1,547.62	\$2.42

## Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$22.94	8	\$183.52
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$1.88	16	\$30.08
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	\$2.84	16	\$45.44
Equipment/Installation	1225	Concrete, CIP, Slab on Grade, non reinforced	Non reinforced concrete formed and cast-in-place as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$150.21	8	\$1,201.68
Mobilization	1138	Mobilization, small equipment	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	\$86.90	1	\$86.90

**Scenario Worksheet**

**Practice and Scenario Description:**

Information Type	Data
Region	Southern Plains
State	Oklahoma
Discipline Group	Agricultural Engineering
Practice Code/Name	561 - Heavy Use Area Protection
Scenario ID	5
Scenario Name	Surfacing for Access Ramps, Rock/Gravel on Geotextile
Scenario Description	This scenario is to be planned with Conservation Practice Standard 575 - Animal Trails and Walkways. The stabilization of animal access ramps by surfacing with rock and or gravel on a geotextile fabric foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install the surfacing material for an animal access ramp. The stabilized area will address the resource concerns of soil erosion and water quality degradation.
Before Practice Situation	The shoreline soil surface around a farm pond has become highly disturbed and has little to no vegetation to stabilize the soil surface, due to the frequency and intensity of use by livestock. As a result, soil erosion, water quality, and animal health are resource concerns that need to be addressed.
After Practice Situation	The access ramp is stabilized with surfacing material comprised of 640 square feet of rock and or gravel on approximately 84 square yards of geotextile fabric foundation material. for areas frequently and intensively used by animals and will address soil erosion and water quality degradation. Installation includes all materials, equipment, and labor to install the surfacing material for an animal access ramp. Mobilization and equipment are included in the Conservation Practice Standard 575 - Animal Trails and Walkways.
Scenario Feature Measure	Area of Ramp
Scenario Unit	Square Foot
Scenario Typical Size	640

**Cost Summary:**

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$554.88	\$0.87
Equipment/Installation	\$0.00	\$0.00
Labor	\$71.52	\$0.11
Mobilization	\$0.00	\$0.00
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$626.40	\$0.98

**Cost Details:**

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1210	Geotextile, non-woven, heavy weight	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials only.	Square Yard	\$4.04	84	\$339.36
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	\$17.96	12	\$215.52
Labor	231	General Labor	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	\$17.88	4	\$71.52

**Scenario Worksheet**

**Practice and Scenario Description:**

Information Type	Data
Region	Southern Plains
State	Oklahoma
Discipline Group	Agricultural Engineering
Practice Code/Name	561 - Heavy Use Area Protection
Scenario ID	6
Scenario Name	Surfacing for Access Ramps, Rock/Gravel in GeoCell on Geotextile
Scenario Description	This scenario is to be planned with Conservation Practice Standard 575 - Animal Trails and Walkways. The stabilization of animal access ramps by surfacing with rock and or gravel in cellular containment grid on a geotextile fabric foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install the surfacing material for an animal access ramp. The stabilized area will address the resource concerns of soil erosion and water quality degradation.
Before Practice Situation	The shoreline soil surface around a farm pond has become highly disturbed and has little to no vegetation to stabilize the soil surface, due to the frequency and intensity of use by livestock. As a result, soil erosion, water quality, and animal health are resource concerns that need to be addressed.
After Practice Situation	The access ramp is stabilized with surfacing material comprised of 640 square feet of rock and or gravel and cellular containment grid placed on approximately 84 square yards of geotextile fabric foundation material. for areas frequently and intensively used by animals and will address soil erosion and water quality degradation. Installation includes all materials, equipment, and labor to install the surfacing material for an animal access ramp. Mobilization and equipment are included in the Conservation Practice Standard 575 - Animal Trails and Walkways.
Scenario Feature Measure	Area of Ramp
Scenario Unit	Square Foot
Scenario Typical Size	640

**Cost Summary:**

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$554.88	\$0.87
Equipment/Installation	\$890.64	\$1.39
Labor	\$107.28	\$0.17
Mobilization	\$0.00	\$0.00
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$1,552.80	\$2.43

**Cost Details:**

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1210	Geotextile, non-woven, heavy weight	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials only.	Square Yard	\$4.04	84	\$339.36
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	\$17.96	12	\$215.52
Equipment/Installation	1054	GeoCell, 4"	Polymer 3-D cellular grid 4" deep that is filled with stone or earth. Includes materials, labor and equipment for the geocell only, does not include backfill.	Square Yard	\$12.37	72	\$890.64
Labor	231	General Labor	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	\$17.88	6	\$107.28

## Scenario Worksheet

## Practice and Scenario Description:

Information Type	Data
Region	Southern Plains
State	Oklahoma
Discipline Group	Water Management Engineering
Practice Code/Name	574 - Spring Development
Scenario ID	1
Scenario Name	Lateral Line & Spring Box Development
Scenario Description	Develop a water source from a natural spring or seep (i.e., spring development) to provide water for livestock and/or wildlife needs utilizing a lateral line and spring box system.
Before Practice Situation	Livestock operation with inadequate fresh water for livestock and an on-site undeveloped spring/seep. This typical scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside), constructing a water collection structure by installing 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) and behind a concrete cutoff wall (6 inch x 4 ft height x 25 ft long) to retain water. Water is directed (via 20 ft long, 4 inch PVC) to a spring box (48 inch diameter x 6 ft long CMP) that is located at the cutoff wall or below the wall, equipped with a watertight lid and two outlets. One outlet serves as overflow pipe to account for occasions where inflow exceeds outflow. The collection system is commonly composed of a single or a network of perforated 4 inch diameter drainage pipe placed in an excavated collection trench that runs across the slope. The outflow pipe from the spring box can be directed to buried large storage (not included), and to a watering facility (not included) for use.
After Practice Situation	Spring development system provides adequate water for the intended use. The system typically runs all year long in most zones. Associated Practices: Livestock Pipeline (516), Watering Facility (614), Fence (382), Critical Area Planting (342).
Scenario Feature Measure	Number of Developments
Scenario Unit	Each
Scenario Typical Size	1

## Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$552.10	\$552.10
Equipment/Installation	\$1,031.24	\$1,031.24
Labor	\$964.64	\$964.64
Mobilization	\$254.64	\$254.64
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$2,802.62	\$2,802.62

## Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$22.94	2	\$45.88
Materials	46	Aggregate, Gravel, Graded, Washed	Gravel, includes materials, equipment and labor to transport and place	Cubic yard	\$23.84	2	\$47.68
Materials	978	Pipe, PVC, 4", SCH 40	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	\$3.01	20	\$60.20
Materials	1270	Pipe, HDPE, 4", PCPT, Single Wall	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only.	Foot	\$0.48	50	\$24.00
Materials	1280	Pipe, CMP, 48", 14 Gauge	48" Corrugated Metal Pipe, Galvanized, Uncoated, 14 gage. Material cost only.	Foot	\$35.51	6	\$213.06
Materials	1281	Spring Collection Box Cover, steel, 4' diameter	4' diameter x 1/4" thick Steel lid with handle for spring collection box. Materials and fabrication.	Each	\$161.28	1	\$161.28
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	\$202.07	2	\$404.14
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.10	11	\$23.10
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	\$37.75	16	\$604.00
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	\$20.23	16	\$323.68
Labor	231	General Labor	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.	Hours	\$20.03	32	\$640.96
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$127.32	2	\$254.64

## Scenario Worksheet

## Practice and Scenario Description:

Information Type	Data
Region	Southern Plains
State	Oklahoma
Discipline Group	Water Management Engineering
Practice Code/Name	574 - Spring Development
Scenario ID	2
Scenario Name	Hillside Concrete Box Spring Development
Scenario Description	Develop a water source from a natural spring or seep (i.e., spring development) at the base of a hill (outcrop) to provide water for livestock and/or wildlife needs utilizing a concrete box catch basin system.
Before Practice Situation	Livestock operation with inadequate fresh water for livestock and an on-site undeveloped spring/seep. This typical scenario develops at the source, and requires no excavating to expose the water source at the spring/seep, constructing a concrete structure (3 sided - 6 inch x 4 ft height x 25 ft long) tied into the hillside, with a 4 inch diameter HDPE perforated riser pipe for outflow (to storage tank not included), and a 4 inch overflow pipe. An aggregate layer is placed in the bottom of the catch basin as a particulate trap/filter. Assumes impermeable earth floor.
After Practice Situation	Spring development system provides adequate water for the intended use. The system typically runs all year long in most zones. Associated Practices: Livestock Pipeline (516), Watering Facility (614), Fence (382), Critical Area Planting (342).
Scenario Feature Measure	Number of Developments
Scenario Unit	Each
Scenario Typical Size	1

## Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$70.66	\$70.66
Equipment/Installation	\$857.14	\$857.14
Labor	\$883.72	\$883.72
Mobilization	\$254.64	\$254.64
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$2,066.16	\$2,066.16

## Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	46	Aggregate, Gravel, Graded, Washed	Gravel, includes materials, equipment and labor to transport and place	Cubic yard	\$23.84	1.5	\$35.76
Materials	978	Pipe, PVC, 4", SCH 40	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	\$3.01	10	\$30.10
Materials	1270	Pipe, HDPE, 4", PCPT, Single Wall	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only.	Foot	\$0.48	10	\$4.80
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	\$202.07	2	\$404.14
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	\$37.75	12	\$453.00
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	\$20.23	12	\$242.76
Labor	231	General Labor	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.	Hours	\$20.03	32	\$640.96
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$127.32	2	\$254.64

**Scenario Worksheet**

**Practice and Scenario Description:**

Information Type	Data
Region	Southern Plains
State	Oklahoma
Discipline Group	Agricultural Engineering
Practice Code/Name	575 - Animal Trail or Walkway
Scenario ID	1
Scenario Name	Access Ramp
Scenario Description	Layout and construct an access ramp to facilitate animal movement, to provide or improve access to water, and/or protect ecologically sensitive, erosive and/or potentially erosive sites and address soil erosion and water quality resource concerns. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practice. Surfacing material is not included in this scenario. Heavy Use Area Protection, Code 561, shall be used if surfacing material is required.
Before Practice Situation	On farmstead area and pastureland and rangeland areas where control of animal movement is needed to address soil erosion and water quality resource concerns.
After Practice Situation	The typical access ramp will be for a 100 head herd of cattle, and is 16 feet wide X 40 feet long, 640 square feet. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock. No surface materials are included with this practice. Consider the adequacy of natural surfacing. If the ramp is vegetated and requires planting, the vegetation shall be planted according to Critical Area Planting, Code 342. Where vegetation is not practical, Heavy Use Area Protection, Code 561, shall be used to provide adequate surface protection. Diversion, Code 362, may also be beneficial. Fencing, Code 382, will be used when needed to control animal movement.
Scenario Feature Measure	Area of Ramp
Scenario Unit	Square Foot
Scenario Typical Size	640

**Cost Summary:**

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$0.00	\$0.00
Equipment/Installation	\$53.04	\$0.08
Labor	\$0.00	\$0.00
Mobilization	\$173.80	\$0.27
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$226.84	\$0.35

**Cost Details:**

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$1.88	24	\$45.12
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$0.66	12	\$7.92
Mobilization	1138	Mobilization, small equipment	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	\$86.90	2	\$173.80

**Scenario Worksheet**

**Practice and Scenario Description:**

Information Type	Data
Region	Southern Plains
State	Oklahoma
Discipline Group	Engineering General
Practice Code/Name	578 - Stream Crossing
Scenario ID	1
Scenario Name	Ford Constructed using Rock or Cast in Place Concrete
Scenario Description	Stabilize the bottom and slope of a stream channel using rock riprap or cast in place concrete. This scenario includes site preparation, dewatering, acquiring and installing gravel or geotextile with rock riprap or cast in place concrete on channel bottom and approaches. Final travel surface shall be the rocks or concrete. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 30 foot bottom width and approaches. Width is 14 feet for a total area as 420 sf. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.
Before Practice Situation	Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.
After Practice 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	Area or Crossing
Scenario Unit	Square Foot
Scenario Typical Size	420

**Cost Summary:**

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$1,018.26	\$2.42
Equipment/Installation	\$146.34	\$0.35
Labor	\$46.62	\$0.11
Mobilization	\$522.50	\$1.24
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$1,733.72	\$4.13

**Cost Details:**

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$56.57	18	\$1,018.26
Equipment/Installation	1215	Truck, dump, 12 CY	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$60.66	2	\$121.32
Equipment/Installation	1227	Excavation, common earth, side cast, large equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$1.39	18	\$25.02
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.31	2	\$46.62
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$238.15	2	\$476.30
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.10	2	\$46.20

**Scenario Worksheet**

**Practice and Scenario Description:**

Information Type	Data
Region	Southern Plains
State	Oklahoma
Discipline Group	Engineering General
Practice Code/Name	578 - Stream Crossing
Scenario ID	2
Scenario Name	Culvert Crossing
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. 36 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 Practice Situation	Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.
After Practice 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, (500) Obstruction Removal, or (584) Channel Stabilization.
Scenario Feature Measure	Culvert Dimensions
Scenario Unit	Inch-Foot
Scenario Typical Size	1440

**Cost Summary:**

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$2,799.94	\$1.94
Equipment/Installation	\$790.32	\$0.55
Labor	\$233.10	\$0.16
Mobilization	\$185.34	\$0.13
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$4,008.70	\$2.78

**Cost Details:**

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$56.57	2	\$113.14
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$23.84	50	\$1,192.00
Materials	1248	Pipe, HDPE, 36", CPT Double Wall	Pipe, Corrugated HDPE Double Wall, 36" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	\$37.37	40	\$1,494.80
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$77.67	10	\$776.70
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.54	3	\$13.62
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.31	10	\$233.10
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$127.32	1	\$127.32
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$17.46	2	\$34.92
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.10	1	\$23.10

## Scenario Worksheet

## Practice and Scenario Description:

Information Type	Data
Region	Southern Plains
State	Oklahoma
Discipline Group	Engineering General
Practice Code/Name	578 - Stream Crossing
Scenario ID	3
Scenario Name	Ford Constructed using Prefabricated Material
Scenario Description	To install a stable crossing medium on channel bottom and approaches. Medium includes but not limited to precast concrete blocks, geocells, pavers, and gabions. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 30 foot bottom width and approaches. Width is 14 feet for a total area as 420 sf. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.
Before Practice Situation	Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.
After Practice 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, (500) Obstruction Removal, or (584) Channel Stabilization.
Scenario Feature Measure	Area of Crossing
Scenario Unit	Square Foot
Scenario Typical Size	420

## Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$860.74	\$2.05
Equipment/Installation	\$146.34	\$0.35
Labor	\$761.82	\$1.81
Mobilization	\$557.42	\$1.33
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$2,326.32	\$5.54

## Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1210	Geotextile, non-woven, heavy weight	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials only.	Square Yard	\$4.04	46.67	\$188.55
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$23.84	9.07	\$216.23
Materials	1842	Geocell, 6"	6-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill.	Square Yard	\$9.77	46.67	\$455.97
Equipment/Installation	1215	Truck, dump, 12 CY	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$60.66	2	\$121.32
Equipment/Installation	1227	Excavation, common earth, side cast, large equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$1.39	18	\$25.02
Labor	231	General Labor	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	\$17.88	40	\$715.20
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.31	2	\$46.62
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$17.46	2	\$34.92
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$238.15	2	\$476.30
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.10	2	\$46.20