

**Practice:** 516 - Livestock Pipeline

**Scenario:** #1 - Buried Pipeline, all diameters

**Scenario Description:** Description: Buried installation of PVC or HDPE (Iron Pipe Size & Tubing) pipeline. Scenario is for 1000 feet of 1½-inch, Sch 40 PVC, ASTM D1785 (0.52#/ft) or (SIDR-PR) ASTM D2239 (PE 3408) HDPE pipe weighs 0.43 lb/ft. Appurtenances include: couplings, fittings, anchors, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 5% of pipe material quantity). Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pond (378), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**Before Situation:** Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:** Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Scenario Feature Measure:** Length of pipe

**Scenario Unit:** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** \$2,782.82

**Scenario Cost/Unit:** \$2.78

**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	\$1.17	1000	\$1,169.47
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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	\$19.74	12	\$236.82
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**Materials**

Pipe, PVC, 1 ½", SCH 40	975	Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785	Foot	\$1.07	1050	\$1,121.76
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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	\$254.77	1	\$254.77
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**Practice:** 516 - Livestock Pipeline

**Scenario:** #2 - Surface Pipeline, all diameters

**Scenario Description:** Description: Surface installation of PVC or HDPE (Iron Pipe Size & Tubing) pipeline. Scenario is for 1000 feet of 1½-inch, Class 200 (SDR-9.0, PE4708) HDPE pipe weighing 0.43 lb/ft. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Pond (378), Watering Facility (614), and Water Harvesting Catchment (636). 5% added to pipe length for appurtenances.

**Before Situation:** Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:** Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Scenario Feature Measure:** Length of pipe

**Scenario Unit:** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** \$1,258.71

**Scenario Cost/Unit:** \$1.26

**Cost Details**

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

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$19.74	8	\$157.88
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**Mobilization**

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$70.35	1	\$70.35
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**Materials**

Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	\$2.07	452	\$935.30
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**Equipment Installation**

Fuser for HDPE Pipe	1383	Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor.	Hour	\$23.79	4	\$95.17
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**Practice:** 516 - Livestock Pipeline

**Scenario:** #3 - Buried Pipeline in Rocky Terrain

**Scenario Description:** Description: Buried installation of PVC or HDPE (Iron Pipe Size & Tubing) pipeline with 10% of line in rocky terrain. 1000 feet of 1½-inch, Sch 40 PVC, ASTM D1785 (0.52#/ft) or (SIDR-PR) ASTM D2239 (PE 3408) HDPE pipe weighs 0.43 lb/ft. Appurtenances include: couplings, fittings, anchors, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 5% of pipe material quantity). Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), Pond (378) and Water Harvesting Catchment (636).

**Before Situation:** Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:** Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Scenario Feature Measure:** Length of Pipe

**Scenario Unit:** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** \$5,187.10

**Scenario Cost/Unit:** \$5.19

**Cost Details**

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

Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$30.84	1	\$30.84
Pipe, PVC, 1 ½", SCH 40	975	Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785	Foot	\$1.07	1050	\$1,121.76

**Equipment Installation**

Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.17	900	\$1,052.52
Trenching, Rock	1097	Includes equipment and labor for cutting trench in rock 6" x 36"	Foot	\$24.90	100	\$2,490.39

**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	\$19.74	12	\$236.82
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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	\$254.77	1	\$254.77
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**Practice:** 516 - Livestock Pipeline

**Scenario:** #4 - Rural water connection in steep topography with a Reduced Pressure Zone device

**Scenario Description:** The rural water connection includes 60' of pipe, a Reduced Pressure Zone device (RPZ), all valves, and necessary installation for connecting from a rural water pipeline to a livestock distribution pipeline. This item includes installation, all materials, appurtenances, and labor required to construct and install meter box. This item does not include the hook-up fees to the rural water system. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636), Spring Development (574), and Prescribed Grazing (528).

**Before Situation:** Inadequate water supply for domestic animals located on grazed range, pasture, or grazed forest in the northern plains region.

**After Situation:** A rural water connection which provides access to a reliable, high quality water supply for meeting the needs of domestic animals on pasture. The meter, pipe and appurtenances will enable the pipeline to meet the quantity requirements of domestic animals.

**Scenario Feature Measure:** Rural water connection

**Scenario Unit:** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$1,726.13

**Scenario Cost/Unit:** \$1,726.13

**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	\$22.85	4	\$91.41
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	\$19.74	8	\$157.88

**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	\$55.82	2	\$111.64
Trencher, 8"	936	Equipment and power unit costs. Labor not included.	Hour	\$89.47	2	\$178.94

**Materials**

Pipe, PVC, 2", SCH 40	976	Materials: - 2" - PVC - SCH 40 - ASTM D1785	Foot	\$1.40	60	\$84.26
Reduced Pressure Zone Device	2486	Reduced pressure principal backflow prevention device (RPZ) is a type of backflow prevention device used to protect an aquifer or water supply from contamination. Includes materials only.	Each	\$452.96	1	\$452.96
Valve, Double Check Backflow Preventer	2559	Designed for installation on potable water lines to protect against both backsiphonage and backpressure of polluted water into the water supply. Includes materials and shipping only.	Each	\$139.51	1	\$139.51

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$254.77	2	\$509.54
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**Practice:** 516 - Livestock Pipeline

**Scenario:** #5 - Rural water connection without a Reduced Pressure Zone device

**Scenario Description:** The rural water connection includes 60' of pipe, all valves, and necessary installation for connecting from a rural water pipeline to a livestock distribution pipeline. This item includes installation, all materials, appurtenances, and labor required to construct and install meter box. This item does not include the hook-up fees to the rural water system. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636), Spring Development (574), and Prescribed Grazing (528).

**Before Situation:** Inadequate water supply for domestic animals located on grazed range, pasture, or grazed forest in the northern plains region.

**After Situation:** A rural water connection which provides access to a reliable, high quality water supply for meeting the needs of domestic animals on pasture. The meter, pipe and appurtenances will enable the pipeline to meet the quantity requirements of domestic animals.

**Scenario Feature Measure:** Rural water connection

**Scenario Unit:** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$1,273.18

**Scenario Cost/Unit:** \$1,273.18

**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	\$22.85	4	\$91.41
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	\$19.74	8	\$157.88

**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	\$55.82	2	\$111.64
Trencher, 8"	936	Equipment and power unit costs. Labor not included.	Hour	\$89.47	2	\$178.94

**Materials**

Pipe, PVC, 2", SCH 40	976	Materials: - 2" - PVC - SCH 40 - ASTM D1785	Foot	\$1.40	60	\$84.26
Valve, Double Check Backflow Preventer	2559	Designed for installation on potable water lines to protect against both backsiphonage and backpressure of polluted water into the water supply. Includes materials and shipping only.	Each	\$139.51	1	\$139.51

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$254.77	2	\$509.54
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**Practice:** 516 - Livestock Pipeline

**Scenario:** #6 - Freeze Proof Hydrant

**Scenario Description:** Provide an adequate amount and quality of drinking water for livestock and address the associated resource concerns such as excessive nutrient buildup, grazing management, poor plant diversity and quality and soil/water quality. This scenario is for a pasture rotation or enhanced pasture management and utilization by installing freeze proof hydrants or quick connect couplers to support small portable water troughs (100 gallon) which provide a water supply. Because the system does not flow continuously a float is needed to maintain the water level within the portable trough. Trough is moved from paddock to paddock as needed.

**Before Situation:** The setting takes place where livestock have open access to existing natural water supplies and/or poor grazing mgt. results in: poor water quality from soil erosion and manure deposit, poor grazing distribution and plant health, overgrazing, poor manure distribution, and poor animal health.

**After Situation:** Improved: water/soil quality, grazing management, plant diversity and quality, manure distribution, water quality, and animal health. A hydrant is located in the pasture and is protected from trampling by a wooden post. A portable heavy duty polyethylene trough is part of an intensive rotational grazing management system. The trough is connected to a water supply system via quick coupler or frost free hydrant. The trough is secured to wooden posts to prevent overturning.

**Scenario Feature Measure:** Number of Freeze Proof Hydrants Installed

**Scenario Unit:** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$154.24

**Scenario Cost/Unit:** \$154.24

**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	\$1.17	10	\$11.69
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$21.70	1	\$21.70

**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	\$19.74	1	\$19.74
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**Materials**

Freeze Proof Hydrant, <= 3' Bury	240	Freeze Proof Hydrant, 3 foot or less bury. Materials only.	Each	\$78.59	1	\$78.59
Pipe, PVC, 3/4", SCH 40	972	Materials: - 3/4" - PVC - SCH 40 - ASTM D1785	Foot	\$0.45	10	\$4.51
Pipe, steel, smooth wall, galvanized, weight priced	1381	Steel manufactured into galvanized smooth wall pipe	Pound	\$1.67	10.79	\$18.01