

**Practice: 642 - Water Well**

**Scenario: #1 - Dug Well**

**Scenario Description:**

Typical construction is for the excavation of a shallow dug well. The purpose of the practice is to provide water for livestock. A typical dug well is 2 to 4 foot in diameter and 15 feet in depth. The well is excavated using a backhoe. Excavate to a depth where the water recharge is greater than the equipment can remove. Washed gravel is placed in the base of the dug opening. Concrete casings about 2 inches thick are installed to hold the water. Pea gravel is placed above the washed gravel to transition to the earth backfill. The hole is backfilled and sloped to direct surface water away from entering the cover.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source.

**After Situation:**

Sufficient water is available for livestock. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Scenario Feature Measure:** Linear Foot of well depth

**Scenario Unit:** Linear Foot

**Scenario Typical Size:** 15

**Scenario Cost:** \$2,372.05

**Scenario Cost/Unit:** \$158.14

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$51.29	10	\$512.90
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	\$333.03	1	\$333.03
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.63	10	\$206.30
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	\$26.19	10	\$261.90
<b>Materials</b>						
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.79	4	\$11.16
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	\$628.90	1	\$628.90
Aggregate, gravel, washed, pea gravel	1331	Washed and graded pea gravel river stone. Includes materials and local delivery within 20 miles of quarry.	Cubic Yard	\$38.43	1	\$38.43
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	\$40.64	1	\$40.64
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$34.86	3	\$104.58
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$234.21	1	\$234.21

**Practice: 642 - Water Well**

**Scenario: #4 - Small Plastic Farm Well, Less Than 6 in**

**Scenario Description:**

Installation of a well with PVC casing diameter of 4 inches or less; typical farm well has 4 inch diameter PVC casing. Note that doubling the diameter of water well casings only increases specific capacity by 10%. Increasing the length of the screened interval in a well is much more cost-effective at increasing yield. A well is drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. A PVC cap and grouting are installed to prevent a direct conduit to ground water, and the well is disinfected in accordance with state and local regulations. The purpose of the practice is to provide water for livestock or small irrigation systems, such as, micro-irrigation. Cost estimate is based on a well depth of 100 feet, with well casing 4 inches in diameter, PVC casing installed to a depth of 50 feet, and typical yield of less than or equal to 250 gpm.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source or there is insufficient water for use in micro-irrigation/small irrigation systems.

**After Situation:**

Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533) and Pipeline (516) or Irrigation water conveyance (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Scenario Feature Measure:** Linear Foot of well depth

**Scenario Unit:** Linear Foot

**Scenario Typical Size:** 100

**Scenario Cost:** \$2,102.00

**Scenario Cost/Unit:** \$21.02

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	\$167.38	4	\$669.52
<b>Materials</b>						
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.79	1	\$2.79
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	\$628.90	1	\$628.90
Well Casing, Plastic, 4"	1803	PVC or ABS non-threaded well casing, 4". Materials only.	Foot	\$3.61	50	\$180.50
Well Cap, 4"	1785	Well cap, 4". Materials only.	Each	\$25.44	1	\$25.44
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	\$40.64	1	\$40.64
Well Screen, plastic, 4"	1998	4" PVC well screen. Materials only.	Foot	\$6.40	50	\$320.00
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$234.21	1	\$234.21

**Practice: 642 - Water Well**

**Scenario: #5 - Small Plastic Farm Well, 6 in and Greater**

**Scenario Description:**

Installation of a well with PVC casing having a diameter of 6 inches or greater. Note that doubling the diameter of water well casings only increases specific capacity by 10%. Increasing the length of the screened interval in a well is much more cost-effective at increasing yield. A well is drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. A PVC cap and grouting are installed to prevent a direct conduit to ground water, and the well is disinfected in accordance with state and local regulations. The purpose of the practice is to provide water for livestock or small irrigation systems. Cost estimate is based on a well depth of 100 feet, with well casing 6 inches in diameter, PVC casing installed to a depth of 50 feet, and typical yield of less than or equal to 250 gpm.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source or there is insufficient water for use in micro-irrigation/small irrigation systems.

**After Situation:**

Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533) and Pipeline (516) or Irrigation water conveyance (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Scenario Feature Measure:** Linear Foot of well depth

**Scenario Unit:** Linear Foot

**Scenario Typical Size:** 100

**Scenario Cost:** \$3,122.50

**Scenario Cost/Unit:** \$31.23

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	\$167.38	4	\$669.52
<b>Materials</b>						
Well Screen, plastic, 6"	1999	6" PVC well screen. Materials only.	Foot	\$15.99	25	\$399.75
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	\$40.64	1	\$40.64
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite grout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	\$628.90	2	\$1,257.80
Well Cap, 6"	1786	Well cap, 6". Materials only.	Each	\$33.29	1	\$33.29
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.79	1	\$2.79
Well Casing, Plastic, 6"	1804	PVC or ABS non-threaded well casing, 6". Materials only.	Foot	\$6.46	75	\$484.50
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$234.21	1	\$234.21

**Practice: 642 - Water Well**

**Scenario: #8 - Deep Well**

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur > 600 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. Well casings are 4-6" in diameter. Cost estimate based on a well 800 feet deep, with casing installed to a depth of 775 feet.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

**After Situation:**

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Scenario Feature Measure:** Linear foot of well depth

**Scenario Unit:** Linear Foot

**Scenario Typical Size:** 800

**Scenario Cost:** \$18,668.49

**Scenario Cost/Unit:** \$23.34

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	\$167.38	32	\$5,356.16
<b>Materials</b>						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	\$40.64	1	\$40.64
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite grout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	\$628.90	1	\$628.90
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.79	1	\$2.79
Well Cap, 6"	1786	Well cap, 6". Materials only.	Each	\$33.29	1	\$33.29
Well Casing, Metal, 6"	1810	Steel well casing, 6". Materials only.	Foot	\$14.01	775	\$10,857.75
Well Screen, stainless steel, 6"	1995	6" Stainless steel well screen. Materials only.	Foot	\$60.59	25	\$1,514.75
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$234.21	1	\$234.21