Practice: 642 - Water Well

Scenario: #1 - Well Point

Scenario Description:

Typical construction is for a 2" diameter well screen, 36" long, with 2"diameter pipe and couplings are driven or water jetted to a typical depth depth of 20 feet into a shallow water bearing formation. The purpose of the practice is to provide water for livestock. The area near the well point is sloped to direct surface water away from entering the well.

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 construciton activities.

Scenario Feature Measure: Depth of Well

Scenario Unit: Linear Foot

Scenario Typical Size: 15

Scenario Cost: $1,078.77 **Scenario Cost/Unit:** $71.92

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	$177.34	2	$354.68
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	$18.71	2	$37.42
Materials						
Well Cap, 2"	1784	Well cap, 2". Materials only.	Each	$30.57	1	$30.57
Well Casing, Stainless Steel/Copper, 2"	1796	Stainless steel or Copper well casing, 2". Materials only.	Foot	$19.81	17	$336.77
Well Screen, plastic, 2"	1997	2" PVC well screen. Materials only.	Foot	$4.17	3	$12.51
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$40.64	1	$40.64
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$266.18	1	$266.18

Practice: 642 - Water Well

Scenario: #3 - Shallow Well, <= 100 feet deep

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 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 irrigation. An average well depth is 75 feet. Well casings are 4-6" in diameter. Plastic casing is installed to a depth of 55 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 irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Scenario Feature Measure: Depth of Well

Scenario Unit: Linear Foot

Scenario Typical Size: 75

Scenario Cost: $3,955.59 **Scenario Cost/Unit:** $52.74

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	$177.34	8	$1,418.72
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	$18.71	8	$149.68
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$22.95	1	$22.95
Well Screen, plastic, 4"	1998	4" PVC well screen. Materials only.	Foot	$6.80	20	$136.00
Well Casing, Plastic, 4"	1803	PVC or ABS non-threaded well casing, 4". Materials only.	Foot	$3.61	55	$198.55
Well Cap, 4"	1785	Well cap, 4". Materials only.	Each	$25.44	1	$25.44
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	$2.79	1	$2.79
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 gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	$714.23	2	$1,428.46
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$266.18	2	$532.36

Practice: 642 - Water Well

Scenario: #4 - Shallow Well with Pitless Unit, <= 100 feet deep

Scenario Description:

Typical construction is for the installation of a well with a pitless unit, in areas where sufficient water is known to occur within 100 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 irrigation. An average well depth is 75 feet. Well casings are 4-6" in diameter. Plastic casing is installed to a depth of 55 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 irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Scenario Feature Measure: Depth of Well

Scenario Unit: Linear Foot

Scenario Typical Size: 75

Scenario Cost: $4,347.50 **Scenario Cost/Unit:** $57.97

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
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	$58.30	2	$116.60
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	$177.34	8	$1,418.72
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	$25.79	2	$51.58
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	$18.71	12	$224.52
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$22.95	1	$22.95
Well Screen, plastic, 4"	1998	4" PVC well screen. Materials only.	Foot	$6.80	20	$136.00
Well Casing, Plastic, 4"	1803	PVC or ABS non-threaded well casing, 4". Materials only.	Foot	$3.61	55	$198.55
Well Cap, 4"	1785	Well cap, 4". Materials only.	Each	$25.44	1	$25.44
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	$714.23	2	$1,428.46
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$40.64	1	$40.64
Pitless Adapter Unit	2549	Attach pitless adapter unit to existing well casing. Includes installation and labor costs.	Each	$148.89	1	$148.89
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$266.18	2	$532.36

Practice: 642 - Water Well

Scenario: #5 - Single PVC Casing, > 100 feet deep

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 300 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. An average well depth is 200 feet. Well casings are 4-6" in diameter. Plastic casing and screen is installed to a depth of 200 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 construciton activities.

Scenario Feature Measure: Depth of Well

Scenario Unit: Linear Foot

Scenario Typical Size: 200

Scenario Cost: $6,679.52 **Scenario Cost/Unit:** $33.40

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	$177.34	20	$3,546.80
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	$18.71	10	$187.10
Materials						
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	$6.80	50	$340.00
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$22.95	1.5	$34.43
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	$714.23	2	$1,428.46
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	$2.79	1	$2.79
Well Cap, 4"	1785	Well cap, 4". Materials only.	Each	$25.44	1	$25.44
Well Casing, Plastic, 4"	1803	PVC or ABS non-threaded well casing, 4". Materials only.	Foot	$3.61	150	$541.50
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$266.18	2	$532.36

Practice: 642 - Water Well

Scenario: #6 - Single PVC Casing with Pitless Unit, > 100 feet deep

Scenario Description:

Typical construction is for the installation of a well with a pitless unit, in areas where sufficient water is known to occur 100 - 300 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. An average well depth is 200 feet. Well casings are 4-6" in diameter. Plastic casing and screen is installed to a depth of 200 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 construciton activities.

Scenario Feature Measure: Depth of Well

Scenario Unit: Linear Foot

Scenario Typical Size: 200

Scenario Cost: $7,071.42 **Scenario Cost/Unit:** $35.36

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
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	$58.30	2	$116.60
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	$177.34	20	$3,546.80
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	$18.71	14	$261.94
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	$25.79	2	$51.58
Materials						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$40.64	1	$40.64
Well Casing, Plastic, 4"	1803	PVC or ABS non-threaded well casing, 4". Materials only.	Foot	$3.61	150	$541.50
Well Cap, 4"	1785	Well cap, 4". Materials only.	Each	$25.44	1	$25.44
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$22.95	1.5	$34.43
Pitless Adapter Unit	2549	Attach pitless adapter unit to existing well casing. Includes installation and labor costs.	Each	$148.89	1	$148.89
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	$714.23	2	$1,428.46
Well Screen, plastic, 4"	1998	4" PVC well screen. Materials only.	Foot	$6.80	50	$340.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$266.18	2	$532.36

Practice: 642 - Water Well

Scenario: #7 - Steel or Copper, >= 100 feet deep

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur greater than 2000 feet from 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. An average well depth is 2500 feet. Plastic Surface casings are 6" in diameter with smaller diameter casing and screen extending into the water bearing formation. Steel casing and screen is installed to a typical depth of 2500 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 construciton activities.

Scenario Feature Measure: Depth of Well

Scenario Unit: Linear Foot

Scenario Typical Size: 2,000

Scenario Cost: $70,965.34 **Scenario Cost/Unit:** $35.48

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	$177.34	120	$21,280.80
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	$18.71	200	$3,742.00
Materials						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$40.64	1	$40.64
Well Casing, Plastic, 6"	1804	PVC or ABS non-threaded well casing, 6". Materials only.	Foot	$6.46	500	$3,230.00
Well Screen, stainless steel, 2"	2278	2" Stainless steel well screen. Materials only.	Foot	$21.10	50	$1,055.00
Well Cap, 6"	1786	Well cap, 6". Materials only.	Each	$33.29	1	$33.29
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	$714.23	2	$1,428.46
Well Casing, Stainless Steel/Copper, 2"	1796	Stainless steel or Copper well casing, 2". Materials only.	Foot	$19.81	2000	$39,620.00
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	$2.79	1	$2.79
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$266.18	2	$532.36

Practice: 642 - Water Well

Scenario: #8 - Steel or Copper with Pitless Unit, >= 100 feet deep

Scenario Description:

Typical construction is for the installation of a well with a pitless unit, in areas where sufficient water is known to occur greater than 2000 feet from 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. An average well depth is 2500 feet. Plastic Surface casings are 6" in diameter with smaller diameter casing and screen extending into the water bearing formation. Steel casing and screen is installed to a typical depth of 2500 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 construciton activities.

Scenario Feature Measure: Depth of Well

Scenario Unit: Linear Foot

Scenario Typical Size: 2,000

Scenario Cost: $71,357.25 **Scenario Cost/Unit:** $35.68

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Rotary Drill Rig with Operator	1595	Rotary drill rig including equipment and power unit costs and labor.	Hour	$177.34	120	$21,280.80
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$58.30	2	$116.60
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	$25.79	2	$51.58
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	$18.71	204	$3,816.84
Materials						
Well Cap, 6"	1786	Well cap, 6". Materials only.	Each	$33.29	1	$33.29
Pitless Adapter Unit	2549	Attach pitless adapter unit to existing well casing. Includes installation and labor costs.	Each	$148.89	1	$148.89
Well Screen, stainless steel, 2"	2278	2" Stainless steel well screen. Materials only.	Foot	$21.10	50	$1,055.00
Well Casing, Stainless Steel/Copper, 2"	1796	Stainless steel or Copper well casing, 2". Materials only.	Foot	$19.81	2000	$39,620.00
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	$714.23	2	$1,428.46
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$40.64	1	$40.64
Well Casing, Plastic, 6"	1804	PVC or ABS non-threaded well casing, 6". Materials only.	Foot	$6.46	500	$3,230.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$266.18	2	$532.36