

Scenario Worksheet									
Practice and Scenario Description:									
Information Type	Data								
Region	Appalachian								
State	North Carolina								
Discipline Group	Environmental Engineering								
Practice Code/Name	634 - Waste Transfer								
Scenario ID	6								
Scenario Name	Concrete Channel								
Scenario Description	<p>Installation of a concrete channel that consists of a slab with curb and footing on each side of the slab for the entire length of the channel to enable the facility manager to direct liquid waste to an existing collection basin and/or waste storage facility.</p> <p>Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation.</p> <p>Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.</p>								
Before Practice Situation	Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.								
After Practice Situation	<p>Typical installation of a 12 foot wide 100' long concrete channel that consists of a 5" thick concrete slab with curbing on each side of the slab that is 2' high, 6" thick with footing for the entire length. The purpose is to transfer liquids or manure slurry from one area to an existing collection basin or waste storage facility. Includes safety chain for equipment.</p> <p>Alternative configurations can consist of the installation of a more narrow or wider channel that may or may not have curbs or a deeper shaped channel and may include a half pipe on the bottom.</p>								
Scenario Feature Measure	Bottom surface area of concrete channel								
Scenario Unit	Square Foot								
Scenario Typical Size	1200								
Cost Summary:									
Cost Category	Scenario Cost	Scenario Cost/Unit							
Materials	\$1,249.28	\$1.04							
Equipment/Installation	\$8,674.50	\$7.23							
Labor	\$3,142.22	\$2.62							
Mobilization	\$185.20	\$0.15							
Acquisition of Technical Knowledge	\$0.00	\$0.00							
Foregone Income	\$0.00	\$0.00							
Total	\$13,251.20	\$11.04							
Cost Details:									
Select Components									
Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost	Component Justification	Quantity Justification
Materials	1952	Safety gate, span manure transfer channel or chute	Safety gate to span manure transfer channel at push off wall or chute outlet. Minimum of 4' tall with openings that will not pass a 6" or larger sphere. Materials and shipping only.	Foot	\$80.00	16	\$800.00	Safety feature where required by practice standard	
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	\$17.28	26	\$449.28	Gravel required for subgrade.	Typical subgrade depth is 6 inches under all concrete structures.
Equipment/Installation	929	Dozer, 80 HP	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$55.16	8	\$441.28	Dozer to grade and shape the site for slab construction and designed drainage grades.	
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	\$329.10	11	\$3,620.10	Curbs 2 ft high with 1 ft footer on both sides of the slab for containment.	Curbs are designed to contain the wastewater flow and withstand impacts from regular maintenance activities.
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	Steel 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	\$207.24	22	\$4,559.28	Concrete channel-slab-on-grade type design	Channel is 100 ft long and 12 ft wide. Slab is designed with steel reinforcement for temperature and shrinkage.
Equipment/Installation	1498	Demolition, concrete	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$13.46	4	\$53.84	Site preparation	Estimated
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$35.43	50	\$1,771.50	Contract supervisor	
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	\$21.98	8	\$175.84	Equipment operator to develop site drainage grades.	
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	\$18.67	64	\$1,194.88	Crew hours for shaping, grading, forming and finishing.	
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$92.60	2	\$185.20		

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Practice and Scenario Description:									
Information Type	Data								
Region	Appalachian								
State	North Carolina								
Discipline Group	Environmental Engineering								
Practice Code/Name	634 - Waste Transfer								
Scenario ID	13								
Scenario Name	Gravily flow 30" diameter conduit attached to an existing inlet structure.								
Scenario Description	<p>Gravily flow conduit is typically a large diameter water tight HDPE sanitary sewer pipe used to transfer manure by gravity from one location to another. The gravity transfer system typically consists of an existing inlet structure or hopper with attachment to a smooth interior large diameter pipe. The pipe conveys the slurry waste liquid between the waste collection point and a manure storage or waste treatment structure. Adequate head on the pipe flow or change in elevation must be available for the gravity system to function and should be evaluated by the design engineer. This practice includes the pipe attachment to an existing inlet structure and all other fittings, trench excavation and backfill, labor and a equipment for installation.</p> <p>This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water.</p> <p>Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.</p>								
Before Practice Situation	An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.								
After Practice Situation	<p>Install a 150 foot long 30" diameter water tight HDPE pipe to transfer manure by gravity from one location to another. A gravity transfer system typically consists of a sealed inlet at an existing waste collection structure to a smooth interior 30" sewer grade pipe that will gravity flow to an outlet at a site of manure treatment or storage. This scenario includes the pipe, inlet, outlet, couplers and all other fittings, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure there is adequate elevation drop before contracting. If required an inlet structure may be contracted under another scenario.</p> <p>The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.</p>								
Scenario Feature Measure	Length of pipe installed								
Scenario Unit	Foot								
Scenario Typical Size	150								
Cost Summary:									
Cost Category	Scenario Cost	Scenario Cost/Unit							
Materials	\$4,446.88	\$29.65							
Equipment/Installation	\$4,928.09	\$32.85							
Labor	\$2,193.36	\$14.62							
Mobilization	\$38.85	\$0.26							
Acquisition of Technical Knowledge	\$0.00	\$0.00							
Foregone Income	\$0.00	\$0.00							
Total	\$11,607.19	\$77.38							
Cost Details:									
Select Components									
Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost	Component Justification	Quantity Justification
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.11	13	\$300.43	Pipe bedding	Depth of bedding is 6"
Materials	1247	Pipe, HDPE, CPT, Double Wall, Soil Tight, 30"	Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	\$25.13	165	\$4,146.45	Includes the pipe, inlet, outlet, couplers and all other fittings for pipeline installation.	Pipeline length used for typical scenario. Additional 10% length to account for fittings, etc.
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.	Hour	\$45.37	30	\$1,361.10	Equipment for trenching and backfilling	
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	\$2.59	45	\$116.55	Final backfill over pipeline trench	This backfill is machine compacted to the ground surface with allowance for settlement. A 20% compaction factor is used for the volume est.
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.23	57	\$241.11	Initial backfill around pipe and over pipe up to 6" depth	This backfill is manually compacted around the pipe up to a depth of 6" over top of pipe. A 20% compaction factor is used for the volume est.
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	\$1.71	125	\$213.75	Trench excavation	Trench width is pipe width plus 1 foot on both sides, 4.5 ft. Trench depth is pipe plus 2 ft of cover and bedding depth, 5 ft.
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	Steel 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	\$207.24	14	\$2,901.36	Site slab repair	Estimated - 150 ft x 5 ft
Equipment/Installation	1498	Demolition, concrete	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic yard	\$13.46	7	\$94.22	Installation site preparation	Estimated
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$35.43	20	\$708.60	Contractor	
Labor	212	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$19.62	30	\$588.60	Backhoe operator	
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	\$18.67	48	\$896.16	Crew hours for monitoring excavation grade, assembly of pipeline system installation and site clean-up	
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$19.43	2	\$38.86		

Scenario Worksheet

Practice and Scenario Description:	
Information Type	Data
Region	Appalachian
State	North Carolina
Discipline Group	Environmental Engineering
Practice Code/Name	634 - Waste Transfer
Scenario ID	16
Scenario Name	Pressure flow 6" PVC pipeline from waste storage pond to waste application site.

Scenario Description	<p>Pressure flow pipeline used to transfer manure wastewater by pumping from the waste storage pond to the field where it is to be applied according to the CNMP. Pressure flow transfer pipelines can be between 3" and 12" diameter but 6" diameter is a commonly used pipe size. Pressure pipe will handle an internal pumping pressure between 130 and 200 psi depending on the designed pumping system and must have gasketed joints to seal for the wastewater transfer.</p> <p>The pressure pipe moves the water by pumping from the intake riser location, through a buried mainline with outlet risers spaced at 300 ft intervals for a traveler applicator. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.</p> <p>This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water.</p> <p>Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.</p>
Before Practice Situation	The waste storage structure is separated from the application fields where wastewater nutrients are needed. Soil nutrients in the near fields have high phosphorus levels from over application near the waste storage facility. The current application operation is high in the use of time and energy and may cause water quality concerns as it is not efficient in transporting the waste to the field.
After Practice Situation	<p>Install a 1000 foot long 6 inch diameter PVC gasketed IPS pipe that has an SDR of 21 and is water tight under pressure flow to transfer the manure wastewater. An inlet riser and is located near the pump site of the waste storage pond and designed for the desired pressure and flow for the application system. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function.</p> <p>The transfer pipeline will deliver the manure slurry to the fields for agronomic nutrient utilization according to the CNMP, thereby protecting water quality resources.</p>

Scenario Feature Measure	Length of pipe installed
Scenario Unit	Foot
Scenario Typical Size	1000

Cost Summary:		
Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$6,556.00	\$6.56
Equipment/Installation	\$2,782.37	\$2.78
Labor	\$2,015.50	\$2.02
Mobilization	\$38.86	\$0.04
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$11,392.73	\$11.39

Cost Details:									
Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost	Component Justification	Quantity Justification
Materials	987	Pipe, PVC, 6", SDR 21	Materials: - 6" - PVC - SDR 21 200 psi - ASTM D2241	Foot	\$5.96	1100	\$6,556.00	Includes the pipe, inlet and outlet risers, couplers, air-vac vents, clean-outs and all other fittings for pipeline installation.	Pipeline length used for typical scenario plus 10%. 1000*1.10=1100 ft
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.23	90	\$380.70	Initial backfill only around pipe and over pipe up to 6" depth	This backfill is manually compacted around the pipe up to a depth of 6" over top of pipe. A 20% compaction factor is used for the volume est.
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	Non reinforced concrete cast-in-place without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$101.67	1	\$101.67	Thrust blocks	Estimated
Equipment/Installation	54	Trenching, Earth, loam, 24" x 48"	Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$2.30	1000	\$2,300.00	Pipeline installation	Digging trench for 6" diameter pipe installation
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$35.43	20	\$708.60	Contractor	
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	\$18.67	70	\$1,306.90	Crew hours for monitoring excavation grade, assembly of pipeline system, installation and site clean-up	
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$19.43	2	\$38.86		

Scenario Worksheet									
Practice and Scenario Description:									
Information Type	Data								
Region	Appalachian								
State	North Carolina								
Discipline Group	Environmental Engineering								
Practice Code/Name	634 - Waste Transfer								
Scenario ID	4								
Scenario Name	Medium sized wastewater reception basin with 6" conduit transfer pipe to waste storage pond								
Scenario Description	Installation for a wastewater collection system that includes materials and structures to collect a design volume between 1000 and 5000 gallons of liquids such as silage leachate, lot runoff and other contaminated liquid effluent which is then transferred through a 6" low pressure conduit to the waste storage structure. This scenario includes a reinforced concrete manure reception pit and a 6" PVC SDR 41 conduit to transfer the manure and wastewater to a waste storage pond. Reception Pit includes safety fence w/gate or solid/grated cover. The transfer conduit consists of the pipe plus the inlet structure connection and all other fittings, trench excavation and backfill, labor and equipment for installation. If pumping is required for the pipe flow velocity that needs to be contracted under PS 633, Pumping Plant. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling. This scenario addresses the potential for surface water and groundwater quality degradation from liquid wastewater running unchecked out of silage bunkers and out of animal feeding lots.								
Before Practice Situation	Inadequate storage is available to collect wastewater from an operation that may contaminate surface or groundwater resources. The transfer of waste water to a waste storage facility is required for the CNMP.								
After Practice Situation	This practice scenario is for the estimated design volume for waste collection and transfer of 4300 gallons of liquid waste and can be transferred under gravity or low pressure flow in a 6" PVC pipeline to a waste storage pond. The practice scenario typically includes materials and installation of flat and formed concrete for curbs and gutters at the basin to collect liquid slurry waste and the installation of an 8'x12'x6" reinforced concrete reception pit formed in place that includes safety fence w/gate or solid/grated cover. The transfer pipeline is assumed to be 300 feet long, 6" PVC jacketed SDR 41 pipe with an adapter for the concrete basin, couplers, air-valve, vents, all other fittings placed as specified by the design, trench excavation, pipe bedding and backfill. Pipe length for contract is increased by 10% to account for required fittings. The cost includes excavation, placement of subgrade as needed, forming, pouring and finishing of concrete structure and backfilling as well as pipeline installation. Transfer pump if needed must be contracted under pumping plant, PS 533.								
Scenario Feature Measure	Collection volume installed								
Scenario Unit	Gallon								
Scenario Typical Size	4300								
Cost Summary:									
Cost Category	Scenario Cost	Scenario Cost/Unit							
Materials	\$1,478.24	\$0.34							
Equipment/Installation	\$8,537.30	\$1.99							
Labor	\$1,553.92	\$0.36							
Mobilization	\$311.60	\$0.07							
Acquisition of Technical Knowledge	\$0.00	\$0.00							
Foregone Income	\$0.00	\$0.00							
Total	\$13,881.06	\$3.23							
Cost Details:									
Select Components									
Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost	Component Justification	Quantity Justification
Materials	984	Pipe, PVC, 6", SDR 41	Materials: - 6" - PVC - SDR 41 100 psi - ASTM D2241	Foot	\$3.20	130	\$1,026.00	Includes the pipe, inlet, outlet, flares, all valves, thrust blocks and all other fittings for pipeline installation.	Pipeline length includes 10% for fittings used for typical scenario
Materials	1725	Safety chain tractor barrier	3/8 in. Transport chain barrier installed to prevent tractor equipment from entering wastewater collection basin or pit. Material cost only.	Foot	\$2.78	40	\$111.20	Safety material installation required by practice standard	Chain barrier for perimeter of reception pit to prevent people, equipment or animals from falling in.
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor.	Cubic yard	\$17.28	18	\$311.04	Subgrade for concrete inlet slab and catch basin bedding and pipe bedding.	Subgrade development area total for pit floor, slab and pipe length.
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.	Hour	\$45.37	32	\$1,451.84	Backhoe for excavation of reception pit, pipe trench and backfilling.	
Equipment/Installation	962	Tractor, agricultural, 120 HP	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	\$47.06	16	\$752.96	Tractor for hauling material.	
Equipment/Installation	929	Dozer, 80 HP	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$55.16	8	\$441.28	Dozer for shaping and grading site for slab construction and designed drainage grades.	
Equipment/Installation	88	Concrete, C/P, 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	\$329.10	14	\$4,607.40	Cast in place concrete floor and walls to develop wastewater reception pit and curbing along slab.	Wastewater reception pit sized at 12 ft. wide by 8 ft. long and 6 ft. deep. The walls are 8 inches thick with 4 ft. footers. This quantity also includes the formation of 2 ft. curbs along the slab for containment.
Equipment/Installation	87	Concrete, C/P, slab on grade, reinforced	Steel 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	\$207.24	6	\$1,243.44	Inlet slab area	Inlet slab estimated at 22 ft. x 18 ft. reinforced slab on grade with the reception pit at the low corner.
Equipment/Installation	1498	Demolition, concrete	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$13.46	3	\$40.38	Site preparation	Estimated
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$35.43	32	\$1,133.76	Contract supervisor	
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Tractors <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$19.62	32	\$627.84	Backhoe operator	
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	\$18.67	96	\$1,792.32	Crew hours for shaping and grading, forming and finishing of reception pit, backfilling. Includes pipeline connections and installation.	
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	\$63.20	2	\$126.40		
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$92.60	3	\$185.20		