Scenario Worksheet

Practice and Scenario Description:	
Information Type	**Data**
Region	Mid Atlantic
State	New Jersey
Discipline Group	Water Management Engineering
Practice Code/Name	606 - Subsurface Drain
Scenario ID	1
Scenario Name	Corrugated Plastic Pipe (CPP), Single-Wall, ≤ 6"
Scenario Description	**Description:** Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline, using a drainage plow. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 5-inch. Construct 1,000 feet of 5-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth 5 feet. The unit is in weight of pipe material in pounds. 1,000 feet of 5-inch, Single-Wall, perforated HDPE CPP weighs 0.50 lb/ft, or a total of 500 pounds. The typical number of mainline connections for 1,000 feet of subsurface drainline is a total of 3 each. **Resource Concerns:** Excess Water (Seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). **Associated Practices:** 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management.
Before Practice Situation	Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).
After Practice Situation	The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.
Scenario Feature Measure	Feet of Pipe
Scenario Unit	Foot
Scenario Typical Size	1,000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$966.90	$0.97
Equipment/Installation	$2,170.00	$2.17
Labor	$0.00	$0.00
Mobilization	$1,641.32	$1.64
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$4,778.22	$4.78

Cost Details:									
Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost	Component Justification	Quantity Justification
Materials	1380	Pipe, HDPE, corrugated single wall, ≤ 12" weight priced Compound	High Density Polyethylene (HDPE) compound manufactured into single wall corrugated pipe or tubing. Materials only.	Pound	$1.83	500	$915.00	Cost for materials only.	(0.5 lbs/ft * 1000 ft) = 500 lbs
Materials	1458	Drainage Lateral Connection	Connect 3"-6" drainage lateral to main drain, includes excavation to 6' depth, install tee on main line, connect lateral, and backfill. Includes material cost for tee.	Each	$25.95	2	$51.90		Typical lateral length per connection is 660 feet. (1000 ft)/(660 ft/connect) = 2 connects.
Equipment/Installation	1457	Trenching, tile line plowing, earth, 60"	Plowing in 3"-15" CPP drain line into earth, 60" depth, includes equipment and labor for trenching, laying, and backfilling.	Foot	$2.17	1000	$2,170.00		Plow in 1000 feet of 5" CPP.
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$285.90	2	$571.80	Backhoe required to dig 6' deep to connect to new laterals to existing drain.	Move in & out.
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	$534.76	2	$1,069.52	Trencher to install CPP laterals.	Move in & out.

Scenario Worksheet

Practice and Scenario Description:	
Information Type	**Data**
Region	Mid Atlantic
State	New Jersey
Discipline Group	Water Management Engineering
Practice Code/Name	606 - Subsurface Drain
Scenario ID	2
Scenario Name	Enveloped Corrugated Plastic Pipe (CPP), Single-Wall, ≤ 6"
Scenario Description	**Description:** Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline with Sand-Gravel envelope, using a drainage trencher. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 5-inch. Construct 1000 feet of 5-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth of 5 feet, and surrounded with a sand-gravel envelope. The unit is in weight of pipe material in pounds. 1,000 feet of 5-inch, Single-Wall, perforated HDPE CPP weighs 0.50 lb/ft, or a total of 500 pounds. The typical volume sand-gravel for 1,000 feet of 12"wide x 12" high envelope is 32 cubic yards. The typical number of mainline connections for1,000 feet of subsurface drainline is a total of 3 each. **Resource Concerns:** Excess Water (seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). **Associated Practices:** 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management, Grass Waterway;412, 620- Underground Outlet;313-Waste Storage Structure
Before Practice Situation	Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).
After Practice Situation	The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.
Scenario Feature Measure	Feet of Pipe
Scenario Unit	Foot
Scenario Typical Size	1,000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,863.22	$1.86
Equipment/Installation	$2,056.64	$2.06
Labor	$151.04	$0.15
Mobilization	$1,641.32	$1.64
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,712.22	$5.71

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost	Component Justification	Quantity Justification
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$28.01	32	$896.32		((12²-∏5²/4)/144)*1000/27 = 37 CY
Materials	1380	Pipe, HDPE, corrugated single wall, ≤ 12" weight priced Compound	High Density Polyethylene (HDPE) compound manufactured into single wall corrugated pipe or tubing. Materials only.	Pound	$1.83	500	$915.00	Cost for materials only.	(0.5 lbs/ft * 1000 ft) = 500 lbs
Materials	1458	Drainage Lateral Connection	Connect 3"-6" drainage lateral to main drain, includes excavation to 6' depth, install tee on main line, connect lateral, and backfill. Includes material cost for tee.	Each	$25.95	2	$51.90		Typical lateral length per connection is 660 feet. (1000 ft)/(660 ft/connect) = 2 connects.
Equipment/Installation	935	Track Loader, 95HP	Equipment and power unit costs. Labor not included.	Hour	$74.16	4	$296.64		Operator for track loader.
Equipment/Installation	1459	Trenching, Earth, 12" x 60"	Trenching, earth, 12" wide x 60" depth, includes equipment and labor for trenching, laying 3"-6" CPP drain line with envelope, and backfilling.	Foot	$1.76	1000	$1,760.00		Trench, lay, place envelope, and backfill 1000 feet.
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	$37.76	4	$151.04		
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$285.90	2	$571.80	Front end loader required to required to keep sand-gravel hopper full on trencher.	Move in & out.
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	$534.76	2	$1,069.52	Trencher to install CPP laterals.	Move in & out.

Scenario Worksheet

Practice and Scenario Description:	
Information Type	**Data**
Region	Mid Atlantic
State	New Jersey
Discipline Group	Water Management Engineering
Practice Code/Name	606 - Subsurface Drain
Scenario ID	3
Scenario Name	CPP ,< 8 inches, Buried 8 feet or >
Scenario Description	This involves installation of perforated HDPE (Corrugated Plastic Pipe) pipe in combination with a stone drain using a hydraulic excavator. The depth of excavation can range from 8 to 15' deep. This drain is installed upslope of a proposed waste storage facility to intercept subsurface water flow. Failure to collect this flow could impair integrety of proposed waste storage facility. **Resource Concerns:** Excess Water (Seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). **Associated Practices:** 313 - Waste Storage Facility, 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management, 620 Underground Outlet.
Before Practice Situation	Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Planned installation of an earthen waste storage facility will be vulnerable to failure from excess soil water upslope of the impoundment.
After Practice Situation	500 LF of 4" CCP pipe is installed in a 12' deep trench backfilled with gravel drain. The drain is 2' wide by 8' high and runs the length of the project. Requires a large excavator and one laborer to intall. The drainage modifications result in reduced risk of failure of the waste storage facility since excessive moisture is now collected and carried around the structure to a safe outlet.
Scenario Feature Measure	Feet of Pipe
Scenario Unit	Foot
Scenario Typical Size	500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$8,748.46	$17.50
Equipment/Installation	$1,863.36	$3.73
Labor	$635.44	$1.27
Mobilization	$1,069.52	$2.14
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$12,316.78	$24.63

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost	Component Justification	Quantity Justification
Materials	1380	Pipe, HDPE, corrugated single wall, ≤ 12" weight priced Compound	High Density Polyethylene (HDPE) compound manufactured into single wall corrugated pipe or tubing. Materials only.	Pound	$1.83	250	$457.50	Cost for materials only.	(0.5 lbs/ft * 500 ft) = 250 lbs
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$28.01	296	$8,290.96	For curtain drain	500' x 8' x 2' = 8000/27=296CY
Equipment/Installation	932	Hydraulic Excavator, 2 CY	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	$155.28	12	$1,863.36	Excavator to dig trench and put fill back in trench in non-curtain drain areas.	Based on Experience
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	$22.79	8	$182.32	Install pipe	Need to connect and place
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	$37.76	12	$453.12	Operator for excavator	
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	$534.76	2	$1,069.52	Excavator to dig trench	Move in & out.