Practice: 630 - Vertical Drain

Scenario: #4 - Sinkhole, Minimal Excavation

Scenario Description: A well, pipe, pit or bore in porous, underground strata into which drainage water can be discharged. Installation will provide a stable outlet for drainage water from a surface or subsurface drainage system. The practice is used to treat a sinkhole with a depth of less than 20 feet in shallow karst areas such as found in Perry, St. Genevieve, and Cape Girardeau counties in Missouri. The sinkhole is located in cropland within karst topography and is expanding through gully erosion. The scenario incorporates concrete, pipe and earthwork necessary to install the practice. Associated practices including, Filter strips (393), Grassed Waterway (412), and Sediment Basins (350) will be used as needed to provide suitable filtering and removing of sediment from water before entering well. Other associated practices are Critical area planting (342), Fence (382), Diversion (362), Open Channel (582), Subsurface Drain (606), Lined Waterway (468), Underground Outlet (620).

Before Situation: A sinkhole is eroding, fields around sinkhole are flooding and ponding water with inadequate outlets and water is being contaminated with pesticides, nutrients, and sediment. Resource concerns include Water Quality: Excess nutrients in surface water or Excess nutrients in groundwater; Water Quality Degradation: Pesticides transported to surface water, or Pesticides transported to groundwater; Soil Erosion: Classic gully soil erosion, Excess Water: Ponding and Flooding.

After Situation: Treatment of a 15 foot deep sinkhole. Installation includes a 20 foot long (includes 5 feet inlet height about ground surface), 12 inch diameter pipe, 8 Cubic yards of concrete for sealing creviced bedrock and stabilizing the pipe, excavation and earth backfill. The sinkhole treatment will provide an adequate outlet for drainage water, protect surface water quality and will also provide control of erosion caused by surface runoff into a natural sinkhole. Associated practices Filter strips (393), Grassed Waterway (412), and Sediment Basins (350) will be used as needed to provide suitable filtering and removing of sediment from water before entering well. Other associated practices include Critical area planting (342), Fence (382), Diversion (362), Open Channel (582), Subsurface Drain (606), Lined Waterway (468), Underground Outlet (620).

Scenario Feature Measure: Number of Sinkholes Treated

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: $2,902.19

Scenario Cost/Unit: $2,902.19

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
Equipment Installation						
Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	$135.34	7	$947.37
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$67.45	4	$269.80
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$116.01	3	$348.04
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	$29.43	7	$206.01
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	$23.83	7	$166.83
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$260.93	2	$521.86
Materials						
Pipe, Steel, 12", Std Wt, USED	1356	Materials: - USED - 12" - Steel Std Wt	Foot	$22.11	20	$442.29