

**Practice:** 359 - Waste Treatment Lagoon

**Scenario:** #1 - Waste Treatment Lagoon

**Scenario Description:** A waste treatment lagoon is a component of a waste management system that provides biological treatment of manure and other byproducts of animal agricultural operations by reducing the pollution potential. Resource concern addressed is water quality by reducing the pollution potential to surface and groundwater by treating and storing liquid waste. Earthen lagoon liners are addressed with another standard. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), and Solid/Liquid Waste Separation Facility (632).

**Before Situation:** Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:** A waste treatment lagoon constructed from on-site material provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing and treating waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : Design Volume 439,440 ft<sup>3</sup>; 260' X 208' (top); 3:1 inside and outside side slopes; cut/fill ratio = 1.25; total depth = 13'; 1' freeboard (not included in design volume)

**Scenario Feature Measure:** Design Storage Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 439440

**Total Scenario Cost:** \$91,079.37

**Scenario Cost/Unit:** \$0.21

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yard	\$3.06	8101	\$24,751.47
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$3.72	9102	\$33,893.30
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.36	9125	\$30,646.50
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$0.79	1389	\$1,097.64

**Materials**

Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.52	8	\$28.18
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**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$434.63	1	\$434.63
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$227.64	1	\$227.64

**Practice:** 359 - Waste Treatment Lagoon

**Scenario:** #2 - Waste Impoundment Facility Renovation Solids Removal

**Scenario Description:** A waste treatment lagoon is a component of a waste management system that provides biological treatment of manure and other byproducts of animal agricultural operations by reducing the pollution potential. During the life of the structure, the solid/liquid waste was removed down to 2 ft of the bottom in order to not damage the liners. The Renovation of Waste Storage Structure, Waste Storage Ponds or Lagoons that have served its design life and filled with solids and is a potential environmental hazard. Resource concern addressed is water quality by reducing the pollution potential to surface and groundwater by treating and storing liquid waste. Earthen lagoon liners are addressed with another standard. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), and Solid/Liquid Waste Separation Facility (632) Closure of Waste Impoundment (360).

**Before Situation:** An active facility with a waste treatment lagoon has reached or surpassed the design life of the structure. Though the structure is currently not causing an environmental hazard, the capacity has been reduced by the accumulation of solids between 40% and 100% capacity has been reached. Lagoon or holding pond has been in operation and liquids removed with only agitation of the manure. The outside embankment has erosion from traffic and erosion threatening the structural stability.

**After Situation:** This scenario assumes a waste treatment lagoon, with top dimensions of 110 ft x 110 ft, 8 ft total depth with 2:1 side slopes. The total structural storage volume equals 71,371 cubic feet. The volume of solid waste to be removed from the bottom 2 ft. equals 13860 cubic feet. In order to suspend solids for removal water is added and agitated. The volume of earthwork (earthfill and shaping) required to redress the slopes is 200 cubic yards. Renovating of a liquid waste treatment impoundment includes agitating, removing, and spreading liquid/slurry waste material, removing solid/sludge waste remaining in the bottom. All waste material shall be land applied in accordance with Nutrient Management (590). The embankment will be returned to its as-built dimensions or as needed for structural stability. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Rehabilitation of the waste impoundment will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment. The site is restored to its former capacity and strength.

**Scenario Feature Measure:** Cubic Feet of Solids Removed

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 13860

**Total Scenario Cost:** \$6,677.39

**Scenario Cost/Unit:** \$0.48

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$3.72	200	\$744.74
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	\$101.21	3	\$303.64
Spreading, manure sludge	1633	Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs.	Cubic Foot	\$0.30	13860	\$4,132.33

**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	\$27.99	3	\$83.96
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	\$22.04	4	\$88.17

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$434.63	2	\$869.26
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$227.64	2	\$455.29