

Practice: 316 - Animal Mortality Facility

Scenario: #1 - <50 CF Incineration Chamber

Scenario Description:

A manufactured Type IV incinerator is installed to handle less than 350 lbs of average daily mortality for the species and size of operation. A high temperature (greater than 1,300 degrees F) is used for incineration with a secondary combustion or after burner chamber prior to flue discharge. The smallest incinerator that meets capacity is used for the average daily mortality rate (in pounds). The payment is made per unit of actual chamber size obtained from the manufacturer’s product literature. This practice addresses resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are also addressed. Non-attainment areas may require higher level of processing such as gasification to meet additional air quality requirements.

Associated Practices: Access Road (560), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), and Waste Storage Facility (313).

Before Situation:

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

After Situation:

An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations. Payment includes a concrete slab to set the incinerator on and a fuel tank. The ash materials are stored in suitable containers until land disposal as per the nutrient management plan.

Scenario Feature Measure: Incinerator Chamber Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 44

Scenario Cost: \$11,252.21

Scenario Cost/Unit: \$255.73

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed 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	\$189.85	4	\$759.40
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.30	8	\$18.40
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	\$125.37	1	\$125.37
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	\$20.29	1	\$20.29
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.74	1	\$23.74
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$31.06	4	\$124.24

Materials

Incinerator, 200 lbs/day	1624	Poultry and livestock incinerator with an approximate chamber capacity of 200 pounds per day. Includes equipment and after burner only.	Each	\$9,337.54	1	\$9,337.54
Fuel Tank, Anchored	1033	Fuel tank for operating incinerators and/or gasifiers. Materials only.	Gallon	\$0.97	285	\$276.45

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
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Practice: 316 - Animal Mortality Facility

Scenario: #2 - 50-100CF Incineration chamber

Scenario Description:

A manufactured Type IV incinerator is installed to handle 350 to 850 lbs of average daily mortality for the species and size of operation such as a very large poultry or medium sized swine operations. A high temperature (greater than 1,300 degrees F) is used for incineration with a secondary combustion or after burner chamber prior to flue discharge. The smallest incinerator that meets capacity is used for the average daily mortality rate (in pounds). The payment is made per unit of actual chamber size obtained from the manufacturer’s product literature. This practice addresses resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are also addressed. Non-attainment areas may require higher level of processing such as gasification to meet additional air quality requirements.

Associated Practices: Access Road (560), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), and Waste Storage Facility (313).

Before Situation:

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

After Situation:

An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations. Payment includes a concrete slab to set the incinerator on and a fuel tank. The ash materials are stored in suitable containers until land disposal as per the nutrient management plan.

Scenario Feature Measure: Incinerator Chamber Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 56

Scenario Cost: \$12,984.38

Scenario Cost/Unit: \$231.86

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.30	8	\$18.40
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed 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	\$189.85	4	\$759.40
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	\$125.37	1	\$125.37
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.74	1	\$23.74
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	\$20.29	1	\$20.29
Materials						
Fuel Tank, Anchored	1033	Fuel tank for operating incinerators and/or gasifiers. Materials only.	Gallon	\$0.97	285	\$276.45
Incinerator, 400 lbs/day	1625	Poultry and livestock incinerator with an approximate chamber capacity of 400 pounds per day. Includes equipment and after burner only.	Each	\$11,069.71	1	\$11,069.71

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$31.06	4	\$124.24
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
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Practice: 316 - Animal Mortality Facility

Scenario: #3 - >100 CF Incineration Chamber

Scenario Description:

A manufactured Type IV incinerator is installed to handle a single 1,200 to 1,500 lb mortality (a single cow or multiple heifers or swine). A high temperature (greater than 1,300 degrees F) is used for incineration with a secondary combustion or after burner chamber prior to flue discharge. The smallest incinerator that meets capacity is used to handle the largest individual mortality. This type of incinerator typically uses a very small footprint, but requires 15-20 gallons of diesel fuel per fill. In order to be cost effective, the usage needs to be significant unless regulations or severe site limitations require this type of facility. The payment is made per unit of actual chamber size obtained from the manufacturer’s product literature. This practice addresses resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are also addressed. Non-attainment areas may require higher level of processing such as gasification to meet additional air quality requirements.

Associated Practices: Access Road (560), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), and Waste Storage Facility (313).

Before Situation:

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

After Situation:

An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations. Payment includes a concrete slab to set the incinerator on and a fuel tank. The ash materials are stored in suitable containers until land disposal as per the nutrient management plan.

Scenario Feature Measure: Incineration Chamber Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 120

Scenario Cost: \$14,785.43

Scenario Cost/Unit: \$123.21

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.30	8	\$18.40
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed 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	\$189.85	4	\$759.40
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	\$125.37	1	\$125.37
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	\$20.29	1	\$20.29
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.74	1	\$23.74
Materials						
Fuel Tank, Anchored	1033	Fuel tank for operating incinerators and/or gasifiers. Materials only.	Gallon	\$0.97	285	\$276.45

Materials

Incinerator, 600 lbs/day	1626	Poultry and livestock incinerator with an approximate chamber capacity of 600 pounds per day. Includes equipment and after burner only.	Each	\$12,870.76	1	\$12,870.76
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$31.06	4	\$124.24

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
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Practice: 316 - Animal Mortality Facility

Scenario: #4 - <700 CF In vessel Rotary Drum

Scenario Description:

A horizontal rotary drum is installed to compost small poultry and swine facility mortality. The facility can handle between 250 and 600 lbs per day of mortality, plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. The payment quantity is based on the interior volume of the rotary composter in cubic feet of the smallest drum that can process the daily mortality as per manufacturer’s recommendations. This practice addresses resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are also addressed.

Associated Practices: Access Road (560), Critical Area Planting (342), Diversion (362), Fence (382), Nutrient Management (590), Roofs and Covers (367), Structure for Water Control (587), Subsurface Drain (606), Underground Outlet (620), and Waste Storage Facility (313).

Before Situation:

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

After Situation:

A 5’ diameter, 22’ long rotary drum is installed on two concrete pads that can process 325 lbs of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel sub-base, and concrete pads and slab at two locations plus small floor and walls to complete composting. Input material reduced by 40-60 percent and put into 4’ high, three sided, 20’x 20’ concrete bin with 10’x20 concrete pad for secondary composting. Area can be protected by adding Roofs and Covers (367) standard. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

Scenario Feature Measure: Volume of Drum

Scenario Unit: Cubic Foot

Scenario Typical Size: 432

Scenario Cost: \$36,129.23

Scenario Cost/Unit: \$83.63

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.30	4	\$9.20
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed 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	\$408.38	6	\$2,450.28
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed 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	\$189.85	11	\$2,088.35
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	\$129.25	4	\$517.00
Materials						
Composter, drum, 12 CY	1627	12 CY drum composter unit. Includes equipment, operation controls, and shipping. Labor not included.	Each	\$30,659.42	1	\$30,659.42
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$31.06	8	\$248.48
Mobilization						

Mobilization

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	2	\$156.50
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Practice: 316 - Animal Mortality Facility

Scenario: #5 - In vessel Rotary Drum=>700 CF

Scenario Description:

A horizontal rotary drum is installed to compost large poultry and swine facility mortality. The facility can handle between 600 and 1000 lbs per day of mortality, plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. The payment quantity is based on the interior volume of the rotary composter in cubic feet of the smallest drum that can process the daily mortality as per manufacturer’s recommendations. This practice addresses resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are also addressed.

Associated Practices: Access Road (560), Critical Area Planting (342), Diversion (362), Fence (382), Nutrient Management (590), Roofs and Covers (367), Structure for Water Control (587), Subsurface Drain (606), Underground Outlet (620), and Waste Storage Facility (313).

Before Situation:

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

After Situation:

A 5’ diameter, 54’ long rotary drum is installed on two concrete pads that can process 810 lbs of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel sub-base, and concrete pads and slab at two locations plus small floor and walls to complete composting. Input material reduced by 40-60 percent and put into 4’ high, three sided, 30'x 30' concrete bin with 10'x30 concrete pad for secondary composting. Area can be protected by adding Roofs and Covers (367) standard. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

Scenario Feature Measure: Volume of Drum

Scenario Unit: Cubic Foot

Scenario Typical Size: 1,079

Scenario Cost: \$70,385.08

Scenario Cost/Unit: \$65.23

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed 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	\$189.85	21	\$3,986.85
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	\$129.25	6	\$775.50
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.30	4	\$9.20
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed 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	\$408.38	9	\$3,675.42
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$31.06	1	\$31.06
Composter, drum, 28 CY	1628	28 CY drum composter unit. Includes equipment, operation controls, and shipping. Labor not included.	Each	\$61,183.77	1	\$61,183.77

Mobilization

Mobilization

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	2	\$156.50
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78

Practice: 316 - Animal Mortality Facility

Scenario: #6 - Static pile, Earthen pad

Scenario Description:

An impervious earthen pad is installed to compost large animal mortalities (dairy cow) in a static windrow and single pile. Additional carbon based bulking material is added to facilitate aeration and provide a proper C:N ratio. Piles are turned at least once to achieve another heat cycle prior to land application. Access is infrequent. Vegetation is required for runoff treatment. Resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported to surface and ground water resources are addressed. Air quality impacts related to odors are reduced.

Associated Practices: Access Road (560), Composting Facility (317), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Diversion (362), Roofs and Covers (367), Structure for Water Control (378), Subsurface Drain (606), Underground Outlet (620), and Vegetative Treatment Area (635).

Before Situation:

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

After Situation:

A compacted earthen surface 50' x 50' is constructed. The site can handle mortality for a 100 cow dairy with heifers and calves. On site soils can be re-compacted to meet required imperviousness. Sufficient area for processing equipment access is included. The site is located out of drainage areas. Off-site water is diverted and any runoff is spread out into a grassed area or vegetated treatment area. Site preparation includes removal of top 1' and re-compacted. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

Scenario Feature Measure: Pad Area

Scenario Unit: Square Foot

Scenario Typical Size: 2,500

Scenario Cost: \$2,117.56

Scenario Cost/Unit: \$0.85

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.26	150	\$639.00
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.30	150	\$345.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	4	\$1,133.56

Practice: 316 - Animal Mortality Facility

Scenario: #7 - Static Pile, Gravel Pad

Scenario Description:

A gravel pad installed on a large dairy (1,000 cows plus heifers) or beef operation with an average daily mortality of 175 lbs/day. The area is sized to compost animal mortality as a static pile or windrow with equipment around materials. Sufficient carbon based bulking material is added to allow natural aeration and a proper C:N ratio. The piles are turned at least once to achieve another heat cycle prior to final disposal (land application). The site is located out of drainage areas. Off-site water is diverted and any runoff spread to a grassed area or vegetated treatment area as per regulations. Resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported to surface and ground water resources are addressed. Air quality impacts related to odors are reduced.

Associated Practices: Access Road (560), Composting Facility (317), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), Structure for Water Control (378), Subsurface Drain (606), Underground Outlet (620), and Vegetative Treatment Area (635).

Before Situation:

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

After Situation:

A 60' x 95' gravel surface is constructed to process animal mortality. 8" thick compacted gravel is installed. The typical layout is 18' wide piles with an 8' wide access area around each pile or windrow. Site preparation includes topsoil removal, minimal regrading and compaction, installing geotextile and then gravel. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

Scenario Feature Measure: Pad Area

Scenario Unit: Square Foot

Scenario Typical Size: 5,700

Scenario Cost: \$7,843.60

Scenario Cost/Unit: \$1.38

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.26	140	\$596.40
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.28	633	\$1,443.24
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.30	140	\$322.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$31.06	140	\$4,348.40
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	4	\$1,133.56

Practice: 316 - Animal Mortality Facility

Scenario: #8 - Static pile, Concrete Pad

Scenario Description:

A concrete pad is installed over permeable soils, karst topography, frequently accessed sites, or sites with regulatory requirements to compost large animal mortalities (1000 cows plus heifers) or beef animal mortality with an average daily mortality of 175 lbs per day. The area is sized to compost animal mortality as a static pile or windrow with equipment around materials. Sufficient carbon based bulking material is added to allow natural aeration and a proper C:N ratio. The piles are typically turned at least once to achieve another heat cycle prior to final disposal (land application). The site is located out of drainage areas. Off-site water is diverted and any runoff spread onto a grassed area or vegetated treatment area as per regulations. Resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported to surface and ground water resources are addressed. Air quality impacts related to odors are reduced.

Associated Practices: Access Road (560), Composting Facility (317), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), Structure for Water Control (378), Subsurface Drain (606), Underground Outlet (620), and Vegetative Treatment Area (635).

Before Situation:

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

After Situation:

A 60' x 95' concrete surface is constructed to process animal mortality. The concrete is installed 6" thick with light reinforcement on 6" of gravel. The typical layout is 18' wide piles with an 8' wide access area around each pile or windrow. Site preparation includes topsoil removal, minimal regrading and compaction, installing gravel or sand subbase and then concrete. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

Scenario Feature Measure: Pad Area

Scenario Unit: Square Foot

Scenario Typical Size: 5,700

Scenario Cost: \$25,395.00

Scenario Cost/Unit: \$4.46

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed 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	\$189.85	105.5	\$20,029.18
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.26	105.5	\$449.43
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.30	220	\$506.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$31.06	105.5	\$3,276.83
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	4	\$1,133.56

Practice: 316 - Animal Mortality Facility

Scenario: #9 - Static Pile, Concrete with curbs

Scenario Description:

A concrete pad with curb is installed over permeable soils, karst topography, frequently accessed sites, or sites with regulatory requirements to compost large animal mortalities (1000 cows plus heifers) or beef animal mortality with an average daily mortality of 175 lbs per day. Concrete curbs are required to keep material and liquid from entering nearby streams and waterways. The area is sized to compost animal mortality as a static pile or windrow with equipment around materials. Sufficient carbon based bulking material is added to allow natural aeration and a proper C:N ratio. The piles are typically turned at least once to achieve another heat cycle prior to final disposal (land application). The site is located out of drainage areas. Off-site water is diverted and any runoff spread onto a grassed area or vegetated treatment area as per regulations. Resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported to surface and ground water resources are addressed. Air quality impacts related to odors are reduced.

Associated Practices: Access Road (560), Composting Facility (317), Critical Area Planting (342), Fence (382), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), Structure for Water Control (378), Subsurface Drain (606), Underground Outlet (620), and Vegetative Treatment Area (635).

Before Situation:

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

After Situation:

A 60' x 95' concrete surface is constructed to process animal mortality. The concrete is installed 6" thick with light reinforcement and 8" x 12" curbs on 6" of gravel. The typical layout is 18' wide piles with an 8' wide access area around each pile or windrow. Site preparation includes topsoil removal, minimal regrading and compaction, installing gravel or sand subbase and then concrete. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

Scenario Feature Measure: Pad area

Scenario Unit: Square Foot

Scenario Typical Size: 5,700

Scenario Cost: \$27,278.50

Scenario Cost/Unit: \$4.79

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed 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	\$408.38	6	\$2,450.28
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed 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	\$189.85	105.5	\$20,029.18
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.26	105.5	\$449.43
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.30	220	\$506.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$31.06	105.5	\$3,276.83

Mobilization

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
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Practice: 316 - Animal Mortality Facility

Scenario: #10 - Static pile, Wood Bins

Scenario Description:

A group of small bins along one side and a long narrow bin on the backside of a concrete pad are installed to compost poultry or small swine mortality in static piles. Sufficient bulking material is added to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed with Roofs and Covers (367). Size of facility based on daily mortality and sizing procedures accepted in particular state.

Associated Practices: Access Road (560), Critical Area Planting (342), Diversion (362), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), Roof Runoff Structure (558), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

After Situation:

An 18' x 40' concrete pad with 4 bins is installed along the front side (5'H x 10'W x 6'L). One 8' wide by 40' long secondary bin is installed. The bin wall is installed with 1' concrete curbing and 4' of treated lumber. A gravel apron is installed on three sides using Heavy Use Area Protection - 561. The roofed portion is addressed using Roofs and Covers 367. Site preparation includes topsoil removal, installing 4" of gravel, setting posts, installing concrete slab, installing wooden walls and doors. Piles turned to go through a second heat cycle prior to final land application. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

Scenario Feature Measure: Total Bin Area

Scenario Unit: Square Foot

Scenario Typical Size: 720

Scenario Cost: \$10,103.86

Scenario Cost/Unit: \$14.03

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed 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	\$189.85	19.25	\$3,654.61
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.30	38.5	\$88.55
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed 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	\$408.38	2.5	\$1,020.95
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$33.20	80	\$2,656.00
Materials						
Lumber, planks, posts and timbers, treated	1609	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.47	448	\$658.56
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	\$0.80	880	\$704.00

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$31.06	19.25	\$597.91
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	2	\$156.50

Practice: 316 - Animal Mortality Facility

Scenario: #11 - Static pile, Concrete Bins

Scenario Description:

Two or more concrete bins, open on one end on a concrete pad, are installed to compost large quantities of poultry or mature swine mortality in static piles. Sufficient bulking material is used to allow natural aeration. Piles are turned to achieve a second heat cycle prior to land application. The roofed portion of the facility is addressed in Cover and Roofs (367). Size of facility based on daily mortality and sizing procedures.

Associated Practices: Access Road (560), Critical Area Planting (342), Diversion (362), Heavy Use Area Protection (561), Nutrient Management (590), Roofs and Covers (367), Roof Runoff Structure (558), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

After Situation:

A 20' deep by 48' long pad with four bins is installed with 4' high walls and one end open. Due to heavy traffic during the loading and movement from bin to bin, the open side requires a concrete apron, which is done under Heavy Use Area Protection 561. The roofed portion is addressed using Roofs and Covers (367). Site preparation includes topsoil removal, installing 6" of gravel, setting posts, installing concrete slab, and installing 4' high concrete walls. Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors, and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, state, and local laws, rules, and regulations.

Scenario Feature Measure: Total Bin Area

Scenario Unit: Square Foot

Scenario Typical Size: 960

Scenario Cost: \$10,751.66

Scenario Cost/Unit: \$11.20

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed 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	\$189.85	18	\$3,417.30
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.30	36	\$82.80
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed 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	\$408.38	15	\$6,125.70
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$31.06	18	\$559.08
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78