

PERMIT APPLICATION SUMMARY

Introduction

Provided herein is the Major Permit Modification Application (PMA) for the Proposed Frey Farm Landfill Vertical Expansion (FFVE), which is owned and operated by the Lancaster Solid Waste Management Authority (LCSWMA). The modifications in this PMA include a vertical expansion of the existing Frey Farm Landfill (FFLF), referred to herein as the Frey Farm Vertical Expansion (FFVE), which will be facilitated by the construction of a mechanically stabilized earth (MSE) berm around the perimeter of the existing FFLF facility. The location of the site is shown on Figure 1, Site Location Map (United States Geological Survey [USGS] 7.5 minute quadrangle map, Safe Harbor, Pennsylvania), with the current property boundary of the FFLF outlined.

As shown on Figure 1, the project area is generally located between the Susquehanna River (at Lake Clarke) and River Road, in Manor Township, Lancaster County, Pennsylvania. The site is also approximately 8 miles south of Columbia, Pennsylvania.

LCSWMA retained ARM Group Inc. (ARM) to prepare this PMA, which has been completed in accordance with the Municipal Waste Management Regulations, Pennsylvania Code Title 25, Chapters 271 and 273, promulgated on December 23, 2000. All PMA forms, narratives, supplemental attachments, design plans, and specifications are provided in this PMA submittal to support the request for a permit modification for the existing FFLF site. This PMA is intended to fulfill the administrative and technical requirements for the proposed FFVE. Details pertaining to the geology, hydrogeology, and environmental analyses are provided in the Phase I PMA, and site development and engineering analyses and details are described and illustrated in the Phase II PMA.

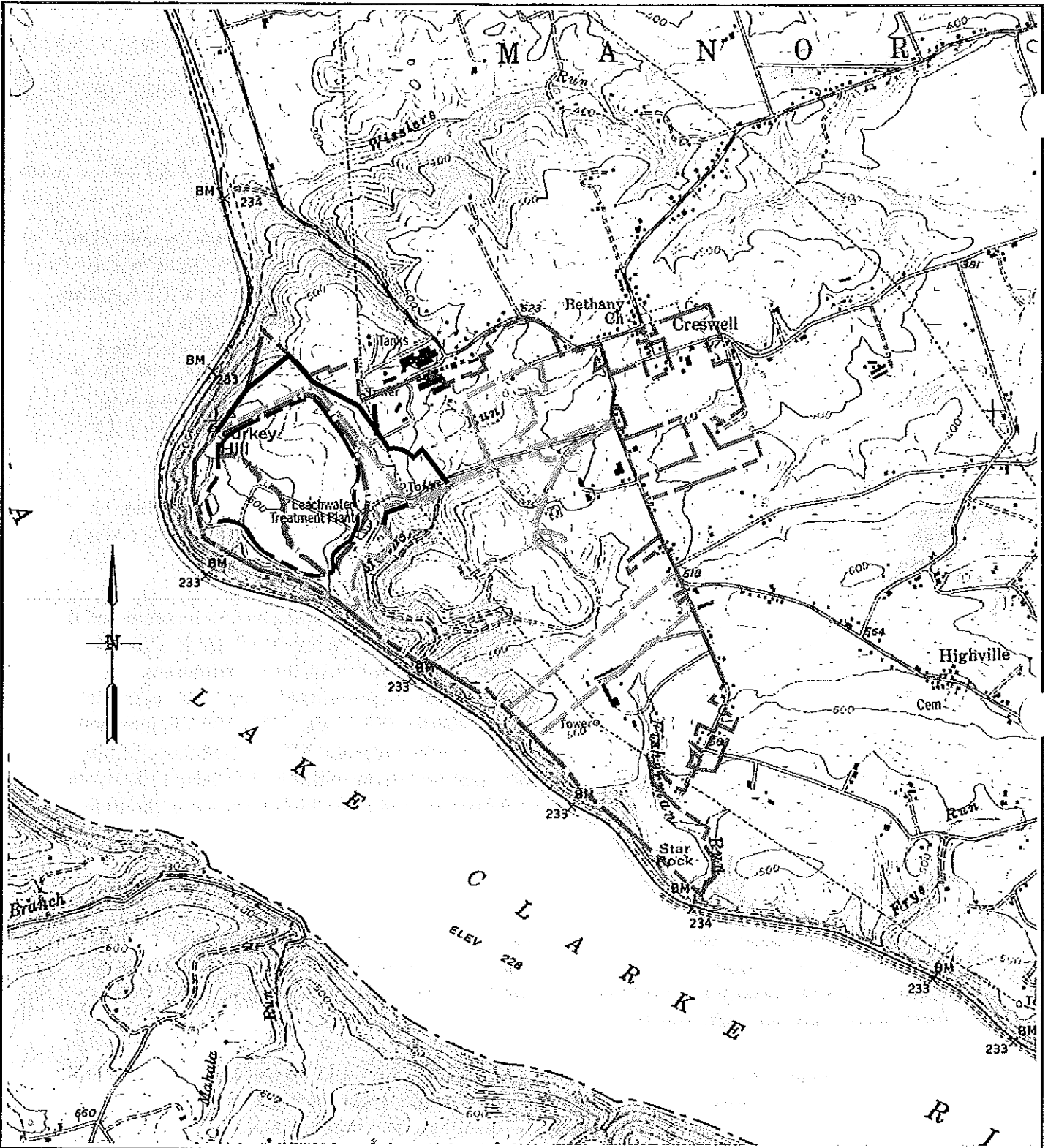
Background

The LCSWMA property consists of approximately 568.7 acres in Manor Township, Lancaster County. The facility itself is comprised of two separately permitted waste management areas, which include the closed, inactive Creswell Landfill and the currently operating FFLF. The FFLF permit area currently consists of 223.5 acres.

The PMA contained herein proposes modifications to the FFLF Solid Waste Management Permit (Permit No. 101389), which was issued by the Pennsylvania Department of Environmental Protection (PADEP) to LCSWMA in 1989. The FFLF is a double-lined landfill facility that is approximately 93 acres in size and consists of six cells. The FFLF accepts municipal, residual, and construction and demolition waste. A significant proportion of the waste accepted at FFLF consists of ash residue sourced from LCSWMA's Waste-to-Energy (WTE) Facility and the Susquehanna Resource Management Complex (SRMC).

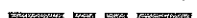






P:\2009\09177 Frey Farm Landfill_Dwg\Vert-Exp_C3D\Vertical Expansion Phase 1\Figure 1 - Site Location Map.dwg, Plotdate: December 23, 2014



Base map from Safe Harbor USGS 7 1/2 minute quadrangle dated 1995.

LEGEND

-  EXISTING LOS/WA PROPERTY BOUNDARY
-  EXISTING FFLP PERMIT AREA (223.5 ACRES)
-  PROPOSED FIVE PERMANENT PERMIT AREA EXTENSION
-  PROPOSED FIVE LIMIT OF WASTE
-  EXISTING FFLP CELL BOUNDARY/PERMITTED FFLP WASTE LIMIT



Site Location Map
Vertical Expansion
Frey Farm Landfill
Manor Township, Lancaster County, PA

January 2015 Scale: 1" = 2000' 09177



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Figure
1

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The existing FFLF landfill is expected to reach its permitted capacity in 2019. In order for the FFLF to continue providing uninterrupted disposal services to Lancaster and Dauphin Counties, additional capacity will be needed by that time, and construction of additional cells should, therefore, begin in 2017. The FFLF currently has a permitted average daily volume (ADV) of 1,500 tons per day of municipal and residual waste, and it has a permitted daily maximum volume (MDV) of 2,000 tons per day.

As presented throughout the PMA, the proposed FFVE project incorporates an increase the ADV of waste that may be disposed of at the FFLF from 1,500 tons per day (tpd) to 2,500 tpd and the maximum daily volume (MDV) from 2,000 and 3,000 tpd. The proposed increases in MDV and ADV are necessary in order to: a) account for the anticipated future population growth and corresponding increased waste generation in Lancaster County; b) maintain a daily "reserved capacity allowance" that would be used in the event of a disruption in service at LCSWMA's Waste-to-Energy Facilities (WTEFs); and c) provide reserved daily hauling and disposal capacity to accommodate special waste disposal events that occur due to natural disasters, large demolition projects, etc.

At the proposed average daily volume of 2,500 tons and 280 operating days per year, the FFVE will be able to accept approximately 700,000 tons per year. The proposed net waste capacity of the proposed FFVE is 6,360,048 yd³. With an ADV of 2,500 tons over the life of the FFVE, the life of the facility will extend until approximately 2029, adding 10 years of capacity to the FFLF.

The following are the objectives of the proposed FFVE project:

- Maintain sensitivity to community interests and concerns, particularly with respect to environmental issues including storm water, groundwater, air quality, traffic, aesthetics, noise, and odor.
- Prepare applications in full compliance with the current Pennsylvania Department of Environmental Protection (PADEP) Chapter 271 and 273 regulations.
- Interact closely with LCSWMA and PADEP personnel so that the PMA is consistent with project objectives and PADEP requirements, incorporating input from PADEP personnel through pre-application meetings.
- Minimize impacts to undisturbed land by constructing a mechanically stabilized earth (MSE) berm on the northern, eastern, and southern sides of the landfill and increasing the final grade (i.e., airspace) of the existing FFLF.
- Update the existing facilities at the FFLF including the leachate storage tanks.
- Provide for an expansion that results in approximately 10 years of added life to the FFLF facility beyond the remaining capacity of the existing landfill.

Scope of Permit Modification

This PMA proposes the following modifications to the FFLF:

- Construction of the FFVE to encompass a total of approximately 75.8+/- acres. The FFVE will incorporate 66.8+/- acres of the existing FFLF for vertical expansion over the existing double-lined area. The proposed FFVE will also increase the FFLF footprint by



approximately 9.0 acres by extending the waste limit outward around the eastern perimeter of the landfill. The FFVE will increase the peak elevation of the landfill from 782 to 832 feet above mean sea level. Additionally, the following associated activities will also be included with construction of the expansion:

- Modify the existing cap and the landfill gas management systems, where applicable, to prepare for the FFVE.
 - Construct a MSE berm on the northern, eastern, and southern boundaries of the landfill.
 - Install extensions for the existing leachate collection systems as well as new headers and storage tanks.
 - Modify existing sediment and storm water runoff management systems, as required.
 - Construct new access and haul roads.
 - Install a double liner system, with a composite component beneath the primary liner, in the area of the FFVE.
- Utilizing the existing on-site soil stockpiles to obtain materials for landfill construction and daily/intermediate/final cover purposes. The on-site soil stockpiles consist of the Wind Turbine Stockpile, the Cell 5 Stockpile, and the Parcels 4 and 5 Soil Borrow Area.

The FFLF permit area will be expanded by 32.3 acres in order to accommodate the above-described proposed modifications.

Design Synopsis

Existing Facilities

The proposed design for the PMA accounts for the characteristics of the existing landfill facilities. The liner systems for the existing landfill areas are summarized below:

<u>Existing Landfill Area</u>	<u>Existing Liner Status</u>
● FFLF Cell 1	Double-lined, DEP-conforming
● FFLF Cell 2	Double-lined with composite component, DEP-conforming
● FFLF Cell 3	Double-lined with composite component, DEP-conforming
● FFLF Cell 4	Double-lined with composite component, DEP-conforming
● FFLF Cell 5	Double-lined with composite component, DEP-conforming
● FFLF Cell 6	Double-lined with composite component, DEP-conforming



Proposed Frey Farm Landfill Expansion

The FFVE will entail 9.0 acres of lateral expansion plus 66.8 acres of vertical expansion over the existing lined landfill. As such, the total facility area consists of 75.8 acres. The approximate waste footprint for each stage is as follows:

- Stage 1 – 14.09 acres
- Stage 2 – 13.89 acres
- Stage 3 – 47.86 acres

The amount of new liner area proposed for each stage of landfill construction is as follows:

- Stage 1 – 2.67 acres
- Stage 2 – 1.83 acres
- Stage 3 – 4.47 acres

The project will utilize approximately 66.8+/- acres of the existing FFLF for vertical expansion over the existing double-lined area. The remainder of the FFVE (i.e., 9.0 acres of double-lined area) extends outward to the north, east, and south of the existing FFLF limits. The FFVE will increase the existing peak landfill elevation from 782 to 832 feet above mean sea level.

The liner system of the FFVE includes the following components:

- Compacted subgrade;
- 6-inch subbase with permeability of less than or equal to 1×10^{-5} cm/sec;
- 60-mil HDPE textured (both sides) secondary liner with a permeability of less than 1×10^{-7} cm/sec;
- Double-sided Geocomposite/HDPE geonet leachate detection zone;
- Geosynthetic Clay Liner (GCL) as the composite component with a permeability of less than 1×10^{-7} cm/sec;
- 60-mil HDPE textured (both sides) primary liner with a permeability of less than 1×10^{-7} cm/sec;
- 24-oz/sy geotextile protective layer; and
- 18-inches of protective cover stone (AASHTO No. 57 or 67) with a permeability of greater than 1×10^{-2} cm/sec.

The existing leachate detection/collection system within the FFLF boundary will be undisturbed. Outside of the FFLF boundary, the leachate conveyance system will be relocated beyond the toe of the MSE berm.

The existing gas management system for the FFLF will be modified in accordance with the PMA drawings to allow continued use and active gas extraction from the existing landfill. Additionally, the non-producing wells will be abandoned.



Mechanically Stabilized Earth (MSE) Berm

A MSE berm is proposed along the northern, eastern, and southern perimeter of the FFLF for the proposed FFVE. The MSE berm will maximize airspace in the facility while concurrently limiting the footprint of the waste disposal area. The following outlines the specifications of the proposed MSE berm:

- a 1.5 factor of safety or greater under static conditions;
- designed in accordance with EPA guidance for seismic conditions with a factor of safety of 1.0 or greater;
- approximately 65 feet maximum height;
- length of approximately 5,200 feet;
- 2H:1V interior slopes;
- 0.5H:1V exterior slopes with geogrid reinforcement and a vegetated wall face; and
- designed with a service road, guide rail, and safety fence.

Ash Mechanically Stabilized Earth Berm (Optional)

In the past, MSE berms have been constructed of soil. However, two different types of MSE berms were included in this PMA application, a typical soil MSE berm and an ash MSE berm. If approved, LCSWMA would be able to decide which type of berm will be constructed. The ash MSE berm will be constructed of ash originating from LCSWMA's Waste-to-Energy Facility and the SRMC. The ash portion of the MSE berm would be underlain by a liner system equivalent to the FFVE liner system. Leachate from within the ash berm, which would mainly be generated during construction activities, will be directed to dedicated sumps and removed by gravity from the landfill through the proposed leachate collection and conveyance system. At the top of the ash MSE berm, a capping system will be installed to prevent infiltration of surface water into the ash material. The ash MSE berm will have the same geometry and dimensions as the earthen MSE berm, however, the ash MSE berm provides a beneficial use for the ash material that would otherwise be placed in the landfill.

Landfill Staging and Construction Sequencing

The following presents the sequence of construction of the FFVE. The construction of the expansion footprint was designed with clockwise progression so as to assist in preserving access. As illustrated in the accompanying project plans, staging is planned to go as follows:

1. Replace the existing leachate storage tanks.
2. Construct Stage 1, including wet well/pump station near Basin C.
3. Operate Stage 1.
4. Construct Stage 2.
5. Operate Stage 2.
6. Construct new access road.
7. Construct Stage 3.
8. Operate Stage 3.



Leachate Management

The existing FFLF leachate management system will undergo minor changes during the proposed FFVE. The existing sump locations within the FFLF will be utilized during the FFVE to collect leachate within the lined limits. Any leachate accumulating on the new liner system associated with the FFVE will be directed into one of the six existing sump locations within the FFLF.

Once the leachate is collected within the designated sump locations, it is removed from the cell through gravity lines that are connected to manholes beyond the liner limits. At the manholes, the leachate flows are measured and then directed to a designated pump station. However, due to the location of the proposed MSE berm, the leachate manholes and headers will be covered during the FFVE. Therefore, as part of the FFVE, the leachate manholes and headers will be relocated beyond the toe of the MSE berm to preserve access. In order to relocate the manholes, the gravity line will be extended from the sump location to the proposed location of the new manholes.

In addition to new leachate manholes and headers, two new wet well/pump stations will be installed as well as new leachate storage tanks. The two new wet well/pump stations will collect the leachate from designated cells and pump the leachate to the new storage tanks. From the leachate storage tanks, the leachate will be pumped to the Lancaster Area Sewer Authority. This process for treating leachate is currently in place at FFLF and no issues have been observed to date.

In addition to relocating several leachate management features, a new, supplemental riser pipe will be installed within Cell 1 at FFLF. In an effort to reduce the secondary flows, a primary riser pipe will be installed to prevent head from developing on top of the liner system. The riser pipe will work in conjunction with the existing sump gravity lines. The existing FFLF liner system does not require any cuts and/or boots to install the primary riser pipe.

Landfill Gas Management

Currently, an active landfill gas collection and control system (LFGCCS) is operating at the FFLF. In addition to collecting landfill gas (LFG) from the FFLF, that LFGCCS also collects LFG from the Creswell Landfill (CL). The LFG is extracted from the FFLF and CL through a series of vertical and horizontal gas extraction wells. The vertical and horizontal gas extraction wells, which are placed under a partial vacuum by a blower that is connected to the collection system, are connected by a series of lateral collection pipes. The lateral collection pipes connect to a header pipe which transports the collected gas to a LFG to energy plant. That plant, which is operated by PPL Renewable Energy, beneficially re-uses the LFG produced by the existing Creswell and FFLF to generate electricity.

To maximize the capture efficiency of the LFGCCS, the LFG collection system will be installed as the waste filling progresses. Also, the landfill gas collection system for the FFVE is designed with vertical wells that have an overlap in the radius of influence. This should provide 100% coverage of the entire waste mass within the proposed FFVE.



An enclosed ground flare is located at the LFG to energy facility, and it is used to combust the LFG in the event that the LFG to energy facility is down for maintenance or repairs or is otherwise not operational. At the flare, the methane in the LFG is utilized as fuel to burn the composite landfill gas. The flare achieves a destruction efficiency of at least 98% of the NMOCs, or less than 20 ppmv NMOC concentration at the flare outlet.

Based upon assessments of the anticipated generation of LFG at the proposed FFVE, the existing flare will not have sufficient capacity to burn LFG produced by the additional waste. Additional flare capacity may be required to serve the proposed FFVE.

The existing gas management system for the FFLF will be modified for continued operation while the proposed FFVE is being constructed and filled. Modifications will include connecting existing LFG extraction wells to new temporary lateral pipes to convey gas to a new LFG header pipe that will also be used for the FFVE.

Erosion and Sediment Control

Surface water runoff and sediment migration will be managed according to the PADEP Chapter 102 regulations (Erosion and Sedimentation Controls).

Closure

Based on the design provided in this PMA and the projected waste tonnage expected, the FFVE will reach capacity in approximately 2029. The capping components will tie into the existing capping systems of the FFLF. The currently proposed design incorporates:

- Active gas collection system;
- 12 inches of intermediate cover soil;
- 10-oz/sy non-woven geotextile;
- 40-mil HDPE/LLDPE geomembrane;
- Drainage geocomposite;
- 18 inches final cover subsoil; and
- 6 inches final cover topsoil.

The bonding worksheets provided in the PMA account for the maximum area of landfill open during the life of the proposed expansion, assuming that all proposed stages of construction and filling are realized. However, LCSWMA will probably update the bonding worksheets annually as site changes occur. Bonding conservatively assumes that as much as 57.1 acres of landfill would be uncapped in a worst-case scenario. Five phases of capping are illustrated on the PMA drawings.

