THIRD FIVE-YEAR REVIEW REPORT FOR
Moyer's Landfill Superfund Site
Montgomery County, Pennsylvania

Prepared by

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Date

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LIST OF ABBREVIATIONS & ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
ICs	Institutional Controls
MCLs	Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
POTW	Publicly Owned Treatment Works
RAO	Remedial Action Objectives
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act of 1986
USACE	U.S. Army Corps of Engineers
UU/UE	Unlimited Use and Unrestricted Exposure

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the third FYR for the Moyer's Landfill Superfund Site (the Site). The triggering action for this policy review is the completion date of the previous FYR dated August 10, 2012. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of two Operable Units (OUs), both of which will be addressed in this FYR. OU1 consists of a landfill cap and appurtenances. OU2 consists of a leachate collection system which discharges to the local Publicly Owned Treatment Works (POTW).

This FYR was led by Sharon Fang, EPA Region III Remedial Project Manager. The review began on September 19, 2016 and the FYR team included the following personnel:

Josh Crooks, Pennsylvania Department of Environmental Protection (PADEP);
Bonnie McClennen, PADEP;
Kim Scharl, EPA Community Involvement Coordinator;
Mark Leipert, EPA hydrogeologist;
Katie Matta, EPA ecologist;
Bruce Pluta, EPA ecologist;
Dawn Ioven, EPA toxicologist;
Betsy Lukens, EPA counsel; and
Patricia Flores-Brown, EPA air specialist.

Site Background

The Site is a 65-acre inactive, privately-owned landfill located at Moyer Road in Collegeville, Lower Providence Township, Montgomery County, Pennsylvania, about twenty-seven (27) miles northwest of Philadelphia (Figure 1, Site Location Map). According to the 2010 Census, Lower Providence Township has a population of 25,436.

The area immediately surrounding the Site is residential. The Site is bounded on the north and west by Evansburg State Park, on the east by a single original farmhouse and barns and a new housing development (Valley High Estates) and on the south by the new housing development and undeveloped land (Figure 2, Site Layout Map). The area surrounding the Site to the north and west consists of open land surrounded by wooded areas on steep slopes. Currently located on the Site are leachate collection tanks and a wooden storage shed in the South Valley.

The Skippack Creek, which flows through Evansburg State Park, is located about 350 feet north-west of the Site. The Skippack Creek then discharges into the Perkiomen Creek which eventually discharges into the Schuylkill River (Figure 2, Site Layout Map). Runoff from the landfill slopes historically flowed westerly into Skippack Creek, prior to EPA involvement at the Site. Currently, runoff is directed towards stormwater basins around the perimeter of the landfill and routed off the landfill cap. In the past, the Skippack Creek has been stocked with trout.

Groundwater in the Site area occurs in an aquifer which generally has poor water yields, particularly at shallow depths. Wells drilled into the deeper portion of the aquifer are often artesian due to the dense, relatively impermeable layer of bedrock overlying the deep system. Most of the residents in the vicinity of the Site are on public water. However, there are approximately ten residential wells along Moyer Road and Visitation Road, which are east of the Site and are upgradient from the landfill. Groundwater from the Site flows to the west and south west, towards the Skippack Creek and there are no residential wells between the Site and the Skippack Creek.

The Site was operated as a municipal landfill from the early 1940s until April 1981, during which time it received municipal waste, sewage and industrial sludges. The landfill accepted a variety of solid and liquid hazardous wastes, including polychlorinated biphenyls (PCBs), dioxins, solvents, paints, low-level radioactive wastes, and incinerated materials in bulk form and/or containerized drums.

The original landfill area was approximately 39 acres in size and was unlined. In the late 1970s, the landfill owners submitted a request to expand the landfill boundaries to the northwest. Site preparation work began on a new disposal area in 1977, and included installation of an asphalt liner prior to filling. Landfilling was reportedly limited to this new, lined area from the late 1970s to early 1981, at which time an order from the Pennsylvania Department of Environmental Resources (PADER), now Pennsylvania Department of Environmental Protection (PADEP), closed the facility.

Originally, there was no management of leachate from the landfill and leachate either seeped into groundwater or discharged directly to the Skippack Creek. In the early 1970's PADER developed and implemented more comprehensive landfill regulations. As a result, a leachate collection system was constructed and began operating in 1972. However, leachate still overflowed continuously from several collection pits located on the property.

In 1981, PADEP closed the facility. The Site was listed on the National Priorities List (NPL) on September 8, 1983. EPA subsequently performed a Remedial Investigation and Feasibility Study (RI/FS), as discussed in detail in the following section.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Moyer's Landfill Superfund Site		
EPA ID: PAD980508766		
Region: 3	**State:** PA	**City/County:** Lower Providence Township, Montgomery County

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name (Federal Remedial Project Manager): Sharon Fang
Author affiliation: EPA
Review period: September 2016 – June 2017
Date of site inspection: October 17, 2016 and November 3, 2016
Type of review: Policy
Review number: 3
Triggering action date: August 10, 2012
Due date *(five years after triggering action date)*: August 10, 2017

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In the early 1980s, on-site leachate and seep samples were collected and analyzed. The samples contained eighty-six (86) priority pollutants and sixteen (16) metals; nearly all were contaminants of concern. The landfill surface showed a number of leachate and seep locations which served as a continuous source of contamination to ground and surface waters. The RI/FS identified the following contaminants which were above screening levels in the leachate and seeps: arsenic, barium, lead, manganese, nickel, zinc, beta radiation, trichloroethylene (TCE), toluene, xylene, di-n-octylphthalate, 2-hexanone, 2-butanone, bis (2-ethylhexyl) phthalate, acetic acid and methylester.

Air monitoring did not identify evidence of impacts to air from the Site.

Surface water samples were taken from Skippack Creek and Perkiomen Creek, and fish samples were taken from Skippack Creek. Contaminants were detected in low concentrations in both surface water and fish, which were attributable to the Site.

Shallow groundwater monitoring wells installed around the periphery of the landfill showed concentrations of contaminants above risk based screening criteria. The shallow groundwater contamination was mostly due to surface water percolation through the landfill and into the groundwater. The groundwater level is below the bottom of the waste in the landfill. Site contaminants were transported directly to the surface water bodies via surface water runoff and indirectly through contaminated groundwater in the shallow aquifer discharging to the creeks. The deeper aquifer was not contaminated.

Residential wells in the vicinity of the landfill along Moyer Road and Visitation Road were sampled for Site-related contaminants in 2001. The residential wells met all EPA Drinking Water Standards at that time.

Response Actions

The Record of Decision (ROD) for the Site was issued on September 30, 1985. The ROD stated the Remedial Action Objectives (RAOs) in the following manner: "The overall strategy is to mitigate and minimize harm to the public health and the environment. This should include minimizing further upper aquifer contamination and the possibility of direct contact with the waste. Leachate control is an integral part of the overall scheme in order to eliminate the continuing migration of contaminants across the site and off the site to the Skippack Creek." Therefore, EPA selected a remedy to prevent direct contact with the landfill waste and prevent offsite migration of contamination via surface water and groundwater, as described below."

The 1985 ROD selected a primary and a contingent remedy. The primary remedy consisted of the gas generation/recovery system. However, the gas generation/recovery system was not feasible due to diminishing gas generation, thus the contingency alternative was implemented. The major components of the contingency remedy include:

- Site preparation for installation of a landfill cap: grading, flattening of steep slopes, retaining walls and installation of rip-rap at areas that are most likely to be eroded;
- Construction of the landfill cap;
- Gas venting and gas monitoring;
- Surface water collection and discharge to Skippack Creek;
- Security/fencing measures;
- Leachate collection and on-site treatment that will meet the 10^{-6} risk level in the groundwater and discharge requirements in Skippack Creek; and
- Operation and Maintenance of the remedy including ground and surface water monitoring, maintenance of the cap and treatment of leachate on-site.

At the time the ROD was signed in 1985, no infrastructure was available to discharge the leachate to a POTW. Subsequently, a sewer main was made available in close proximity to the Site. Because of this changed condition, the on-site treatment system was designated as OU2 with the remainder of the remedy designated as OU1.

On January 3, 2000, EPA issued an Explanation of Significant Differences (ESD) for OU2 which modified the ROD by replacing on-site leachate treatment with off-site leachate treatment at an existing POTW. This change better protected the surface waters and the environment from the potential failure of an undersized on-site treatment plant. In addition, routing the leachate to the POTW was shown to be more cost effective than building and operating an on-site leachate treatment facility.

On September 18, 2009, EPA issued a second ESD to require Institutional Controls (ICs) as part of the remedy. ICs are non-engineered instruments, such as administrative and legal controls, that are necessary for the protection of the integrity of the remedial measures on-site to ensure long-term protection of human health and the environment. ICs play an important role in Superfund remedies because they reduce exposure to contamination by limiting land or resource use, guide human behavior at a site, and protect the integrity of the remedy's components. The ESD required ICs to prevent disturbance of the landfill cap and associated remedy components and to protect the remedy and prevent exposure to contamination at the Site.

Status of Implementation

Construction of the OU1 landfill cap was completed in November 1994. Construction of the OU2 leachate collection system was initiated in 2000 and completed in August 2002. Construction of OU2 was divided as follows: 1) Montgomery County constructed the municipal interceptor, 2) EPA via USACE constructed the necessary leachate equalization tanks, and 3) PADEP was responsible for collecting and transferring the leachate to the equalization tanks and from the tanks to the municipal interceptor.

EPA and PADEP conducted a final inspection of the OU1 and OU2 remedial actions on August 30, 2002 and determined that the remedy had been constructed in accordance with the remedial design plans and specifications and that no further response is anticipated for the Site. The Site achieved construction completion when the Preliminary Close-out Report (PCOR) was signed on September 17, 2002.

Implementation of Institutional Controls

As indicated above, the September 2009 ESD required ICs as part of the remedy. In October 2011, Lower Providence Township approved an ordinance to implement the ICs for the Site, as summarized in the table below:

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Landfill cap, gas vents, monitoring wells, leachate collection and conveyance system, and security measures	Yes	Yes	Remedial systems associated with the landfill	No disturbance or interference	Township ordinance

The township ordinance states:

> "It shall be unlawful for any Owner, lessor, lessee or occupier of the Property, or any other Person to engage in any activities on the Property that would in any manner disturb or interfere with the environmental remedial systems at the Property, including, without limitation, the landfill cap, gas vents, monitoring wells, leachate collection and conveyance system, and security measures, such as fencing, that prevent access to the Property. The prohibited activities include, but are not limited to the following:
>
> A. Digging in or disturbance of the landfill cap, tampering with hardware or equipment associated with the gas vents, monitoring wells, leachate collection and conveyance systems or the security fencing.
>
> B. Any use of leachate generated at the Property including, without limitation, any activities that could cause exposure to contaminants in the leachate via ingestion, vapor inhalation or dermal contact.
>
> C. Digging in or disturbance of the landfill cap including, without limitation, any activities that could result in contact with contaminants in the soils at the Property through ingestion, inhalation or dermal contact."

Systems Operations/Operation & Maintenance

The U.S. Army Corps of Engineers (USACE) was responsible for Operation and Maintenance (O&M) of the landfill cap and appurtenances (OU1) for the first eighteen months after construction. In May 1996, PADEP took responsibility for OU1 O&M. The responsibility for O&M of the off-site treatment system (OU2) has always been with PADEP. EPA provided training on the system for PADEP and PADEP has been operating the system since start-up. The leachate currently is permitted by the Oaks POTW to meet their pretreatment program standards.

After PADEP connected the leachate collection system to the POTW in 1999, some leachate continued to discharge to the Skippack Creek from the NW Valley outfall. From 2000 to 2006, PADEP sampled the Skippack Creek as part of O&M. Stream water was collected at two locations, upstream (SW4) and downstream (SW5) of the observed leachate outfall and was analyzed for site-related contaminants (volatile organics, semi-volatile organics, inorganics, pesticides, total PCBs, coliform and other chemical parameters). PADEP noted no difference between the upstream and downstream samples, therefore they concluded there was no ongoing impact to Skippack Creek from the leachate outfall. PADEP discontinued stream sampling in 2006. No sediment samples from the creek were taken.

PADEP currently reports O&M status and issues to EPA on a routine basis, as noted below. PADEP O&M responsibility consists of the following activities:

1) Site Inspections: Routine site inspections include observations of the fence line, road, landfill cap and functioning of the leachate collection system at least once per month. The leachate collection system is inspected specifically for integrity

of the leachate holding tanks, the leachate level in the manholes, the flow meter reading, and the state of the discharge pipe.

2) Leachate Monitoring: Monitoring leachate involves taking a monthly reading of the leachate volume discharged to the POTW, and reporting information on total gallons per month and average daily flow rate to the POTW on a monthly basis, by the 15th of the month.

3) Grass cutting: The grass at the Site is cut no less than once per year in order to discourage the growth of small trees and shrubs, and also to aid in the identification of soil erosion. The landfill cap and surface water management features are inspected prior to each mowing.

4) Cap Repairs: This task is performed during the growing season, as needed, to ensure integrity of the landfill cap and to reestablish vegetation on any soil repairs to limit additional erosion.

5) Perimeter Road Repairs: Areas to be repaired are noted during Site inspections and repaired accordingly. This task includes the "bridge crossings" over surface drainage features.

6) Fence Repairs: Holes in the fence or damage from fallen trees are noted during Site inspections and repaired as needed.

7) Tree removal: This task is limited to trees that have damaged the perimeter fence or have the potential to damage the landfill cap. Trees to be removed are identified during the Site inspections.

8) Sampling: Groundwater and air monitoring/gas vent samples are collected by PADEP personnel and analyzed by the PADEP's Bureau of Laboratories at least every other year.

   a) Groundwater monitoring – Five monitoring wells, and the leachate sump in the South Valley are analyzed for volatile organics, TAL metals, and cyanide. The leachate may also be analyzed for other parameters requested by the POTW.
   b) Air monitoring – Eight Summa canisters are deployed around the landfill (upwind and downwind) in order to identify concentrations of volatile organic compounds. In addition, PADEP also deploys up to six smaller, silica-lined Summa canisters to sample directly from active gas vents on the Site.

PADEP reported the following O&M issues during the period:

1) Site Inspections: PADEP attempted to visit the Site on at least a monthly basis, as the weather permitted. Visits to the Site were made on a more frequent basis while field activities were being conducted. Site visits include inspections of the

access road, fenceline integrity, landfill cap integrity and the leachate collection systems.

2) Electrical Repairs: During the fall of 2014, PADEP determined that there was no power to the Site. After a thorough inspection of all pump stations, the north and South Valley pump station were found to be in need of extensive repairs. The north valley had the most extensive damage due to pest infestation inside the main electrical box. All electrical components were replaced inside the North Valley pump station. Preventative measures were installed to avoid any further issues from pests. Both pumps inside the North Valley station were also found to be inoperable and in need of replacement. The leachate collection system vault was drained and both pumps and their associated electrical components were replaced. Similar repairs were made to the South Valley pump station including replacing some damaged electrical components.

3) Leachate Monitoring: Leachate monitoring was conducted on a monthly basis reading the flow meter that is connected to the discharge piping. During the fall of 2014, PADEP determined that there was no power to the site and therefore, the leachate collection pumps were not in operation. Monthly readings of the flow meter yielded no change in the discharge amount. While the repairs were taking place, the leachate discharged to the POTW by gravity. Once repairs were made in May 2016, the leachate collection system was returned to full operational status. Subsequently, monitoring of the leachate collection system and the associated flow meter were made on a monthly basis.

   Extensive repairs were made to the leachate tank farm piping network in March. PADEP removed the insulation on the exposed piping network and assessed the extent of repair needed to return the system to working order. Approximately 90% of the external piping network had to be replaced due to integrity failure. The piping was replaced and new insulation and heat trace wire was installed. Two basket strainers were also placed in line of the leachate piping network before the holding tanks in order to prevent any fouling of the flow meter from large debris or material. Electrical repairs were also made to the heat trace wiring system to ensure that it was fully operational.

   Issues with the flow meter malfunctioning were ongoing during the months following the system repairs. The flow meter was being fouled by the collection of fine grain sediments inside the internal impeller. In October 2016, PADEP removed and cleaned the flow meter. The flow meter has since been reinstalled and has been in working order.

   Because of periodic failure of the flow meter, the POTW has been estimating discharge rates based on previous months. Due to the recent operational issues, the POTW is assuming maximum discharge rate.

4) Grass cutting: Grass cutting was completed in the Fall of 2012 through 2016, at least once per year. The landfill cap and surface water management features were inspected after each mowing to identify any potential issues.

5) Cap Repairs: In the Spring of 2014, PADEP performed extensive repairs to erosion issues on the cap (Figure 3). Soil onsite and imported stone were used to repair the cap and the areas were re-graded and seeded. During the site inspections, pooling water was observed along the berms near the access road going across the cap. This may require attention in the near future in order to prevent any issue before they happen.

Two specific locations were identified for repairs: (1) severe erosion issues in the North Valley and (2) a large seep located near the South Valley pumping station. A large drainage feature installed in the North Valley had failed due to the high velocity of surface water draining off the cap. The repairs included the removal of sediment and stone that had washed down into the drainage feature and clogged a storm drain and culvert at the bottom. After removing the sediment and stone, the drainage feature was reconstructed and widened. Stone removed from the drainage feature was repurposed in the repairs, and new large rip rap stone was brought in to develop the drainage feature. Preventative maintenance features within the reconstructed drainage feature also helps to slow the velocity of surface water as it enters the North Valley. The second area of concern was a seep area noted near the leachate tank farm in the South Valley. Large rip rap stone was used to cover the area and create a small drainage feature to alleviate any standing water present in this area. Minor grass repairs on bare spots located throughout the cap were also addressed with grass seed and straw.

There are also some areas that may require attention in the near future in order to prevent any issues before they happen. Some small washed out areas near the grout pillow drainage features throughout the Site have been noted. These repairs have been planned for Spring of 2017.

6) Road Repairs: In 2014, the bridge to the northern side of the landfill failed and extensive repairs were conducted to replace the culvert and replenish the soil and stone over the culvert.

In October 2015, PADEP performed extensive repairs on the access road leading to the cap and on parts of the access road heading down into the South Valley.

In November 2016, PADEP paved the access road leading to the main entrance gate. Approximately a 100’ x 10’ section was paved.

7) Fence Repairs: Each year, several holes were noted in the fence line during the erosion and sediment repairs that had been created by trespassers. PADEP repairs these holes as they are discovered.

8) Tree removal: During the annual grass cuttings, PADEP performed maintenance to remove and cut back trees growing on the cap. In 2016, preventative maintenance was conducted to cut back trees or branches that may pose a threat to the integrity of the fence line.

9) Sampling: PADEP conducted groundwater and air monitoring/gas vent sampling in 2014 and 2016. Results of the sampling are presented in the Data Review section of this FYR.

The Site property was sold on November 2, 2016 in a tax sale. Potential land use changes are unknown at this time. PADEP will continue periodic inspections as well as retain O&M of the infrastructure associated with the off-site leachate treatment system, however, the new owner of the property will be performing limited O&M tasks for the landfill cap (OU1) under an prospective purchaser agreement (PPA) with PADEP. The PPA was finalized after the mandatory 60-day public comment period from February 10, 2017 through April 12, 2017. PADEP received two comments during the comment period; one was quite lengthy. PADEP finalized their response to comments and the PPA became effective on May 17, 2017. PADEP will update the O&M Plan to reflect the new property owner's O&M responsibilities as follows:

- Grass cutting of the cap annually, at a minimum, at the end of the growing season between September and October, or upon request in writing by PADEP;
- Maintenance and repair of the chain link fence to retain its integrity and to prevent any trespassing along the perimeter of the Site as needed, or upon request in writing by PADEP;
- Maintenance and repair of the perimeter road around the Site so that it is easily accessible and visible at all times including but not limited to mowing of the access road no less than twice per year, once in early summer between May and June and once more during the annual grass cutting event or upon request in writing by PADEP;
- Any tree, branch, or shrub removal necessary for the maintenance of the cap, the grass cover, and/or the fence as requested in writing by PADEP;
- Repair of erosion of the soil cap unless the area of the repairs exceeds 1,000 sq/ft.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR as well as the recommendations from the last FYR review and the current status of those recommendations.

Table 1: Protectiveness Determinations/Statements from the 2012 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Protective	This second Five-Year Review for Moyer's Landfill finds that the remedy has been constructed in accordance with the requirements of the ROD and is functioning as designed. The immediate threats have been addressed though capping the landfill and collecting and properly disposing of the leachate. Since the Remedial Actions at both Operable Units are protective, the Site is protective of human health and the environment. Long-term protectiveness of the remedy will be maintained by continuing to perform operation and maintenance of the landfill cap and leachate collection system; monitoring the landfill gas; and enforcing the institutional controls.

Table 2: Status of Recommendations from the 2012 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description*	Completion Date (if applicable)
01	Frequent trespassing and damage to the fence.	Enforcement of Township Ordinance should deter trespassing and fence cutting.	Ongoing	Confirmed township police is continuing to monitor trespassing & fence cutting. Efforts will be ongoing.	NA
01	Erosion along the drainage bench-downslope drain transitions occurs more often than preferable.	Replace soil and plant grass at optimal time to establish the transition area along the grout bag channels.	Completed	Transition area along grout bag channels have been stabilized using standard contractor vegetation mixes that were heavy on perennial rye and red fescues. This was confirmed during the site inspection.	10/17/2016

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by placing an advertisement in the Times Herald newspaper on April 16, 2017 (Attachment 1). The advertisement notified area residents of the FYR explained why EPA was conducting a FYR, invited the public to ask questions or provide any Site information to EPA, and provided contact information for the Community Involvement Coordinator (CIC). Neither the CIC nor the RPM received any questions or comments as a result of the ad. The ad also noted that the completed FYR will be made available online at https://www.epa.gov/superfund/search-superfund-five-year-reviews.

Also, public notice of the PPA between PADEP and the new property owner was published in the Times Herald newspaper on February 10th and 11th, 2017.

During the FYR process, the EPA RPM, PADEP project manager, and EPA CIC conducted an interview with Lower Providence Township personnel on October 17, 2016. This interview served to document any perceived problems or successes with the remedy that has been implemented to date**.** The following topics were discussed:

- Overall: The Site is quiet. Occasionally, the township hears from residents about traffic in/out of the farmhouse.

- Ownership: At the time of the interview, the township was aware of the impending tax sale of the Site. The township was unclear what the prospective owner's plans were for the Site. As indicated above, the tax sale was completed in November 2016 and the new owner subsequently entered into a PPA with PADEP to perform limited O&M at the Site.

- Ordinance: The township shared that the local police performs periodic patrol for trespassers since trespassing is common. The township committed to continuing this practice.

- Communication: The township is pleased with the overall communication about the Site. They do not have any issues related to the Site landfill and are not receiving any Site-related complaints. The township requested that PADEP notify them when contractors will be working on the Site so that they can update the township website. The township also requested copies of PADEP's annual O&M report.

Data Review

Monitoring data provides information to assess and demonstrate that the remedy is achieving the performance standards described in the ROD, and provides information for the FYR. Listed below is a summary of the monitoring events performed at the Site.

In 2014 and 2016, PADEP performed sampling of groundwater, leachate, gas vents, and ambient air. All the samples were analyzed by PADEP's Bureau of Laboratories in Harrisburg, PA. Upon review of the current leachate and groundwater sampling, there is no data that indicates that contaminants are migrating from the Site at concentrations that may be negatively impacting Skippack Creek. Therefore, no surface water samples were collected from the Skippack Creek during this FYR period.

Groundwater Monitoring

PADEP performs groundwater monitoring in order to confirm that there is no migration of contamination from the landfill. The following locations were sampled in 2014 and 2016 for VOCs, TAL metals, and cyanide:

LS-1	Manhole in the South Valley, pumps to leachate tanks
MW-4S	4" Well @ South Valley Outside Fence, shallow
MW-4D	4" Well @ South Valley Outside Fence, deep
MW-5	4" Well @ Roadside Between Sedimentation Basins #2 & #3
MW-R1	6" Well @ Visitation Road and Grange Ave
MW-R2	4" Well @ Visitation Road and Grange Ave

Figure 2 is a map showing the on-site groundwater well locations and site features. Groundwater flows toward Skippack Creek such that wells MW-4S, MW-4D and MW-5 are on the downgradient edge of the plume, and wells MW-R1 and MW-R2 are upgradient. Most residents in the area receive water from the local public water supply, and no residential wells exist between the landfill and the downgradient monitoring wells.

All 2014 and 2016 groundwater monitoring well samples were collected using Passive Diffusion Bags (PDBs). Since there is limited monitoring well construction information available the depth of deployment was estimated based on the depth of the well. To assure equilibrium conditions were reached, the bags were deployed in the wells for a minimum of two weeks. Samples taken at LS-1 were collected using a bailer in the concrete vault prior to the holding tanks located in the South Valley.

The 1985 ROD did not select cleanup levels for groundwater. However, because groundwater in the vicinity of the Site is a potential drinking water source, groundwater concentrations were compared to federal Maximum Contaminant Levels (MCLs) to evaluate the protectiveness of the remedy for this FYR.

In 2014, all wells were non-detect for all VOCs, except MW-5. At MW-5, cis-1,2 Dicholorethene (cis-1,2 DCE) was detected at a concentration of 2.1 ug/l, below the MCL of 70 ug/L and vinyl chloride was detected at a concentration of 0.78 ug/l, below the MCL of 2 ug/L.

In 2016, the groundwater monitoring wells were analyzed for VOCs. A seep in the South Valley (Figure 2), and the leachate discharge at the South Valley manhole (LS-1) were also analyzed for VOCs, metals, cyanide, oil & grease and general chemistry. As in 2014, all wells were non-detect for all VOCs, except MW-5. At MW-5, cis-1,2 DCE was detected at a concentration of 3 ug/l, below the MCL of 70 ug/L and trichlorethene (TCE) was detected at a concentration of 2.3 ug/l, below the MCL of 5 ug/L. Table 3 summarizes the VOCs that were detected during groundwater sampling and compares the results to MCLs. No VOCs were detected in the groundwater monitoring wells, seep, or leachate during the 2016 monitoring event above MCLs.

Samples from the leachate LS-1 and seep in the South Valley are consistent with results of previous sampling events.

Table 3
Summary of 2016 Groundwater Sampling Results for VOCs (ug/l)

Location	MW-R2	MW-R1	MW-5	MW-4S	MW-4D	MCL
ACETONE	ND	ND	ND	ND	ND	*
T-BUTYL ALCOHOL	ND	ND	ND	ND	ND	*
TETRAHYDRAFURAN	ND	ND	ND	ND	ND	*
TOLUENE	ND	ND	ND	ND	ND	1,000
cis-1,2-DCE	ND	ND	**3**	ND	ND	70
TRICHLOROETHENE (TCE)	ND	ND	**2.3**	ND	ND	5
CHLOROBENZENE	ND	ND	ND	ND	ND	100
CHOLOROTOLUENE	ND	ND	ND	ND	ND	*

* = MCL does not exist for these constituents
ND = Not detected

Landfill Gas Monitoring- Gas Vent
On April 22, 2014, PADEP collected vapor samples directly from three passive gas vents on the site (GV-1, GV-2, and GV-3) at the locations marked on Figure 4. On June 13, 2016, PADEP collected vapor samples directly from four passive gas vents on the site (GV-12, GV-20, GV-30, and GV-50) as marked on Figure 5. The passive gas vent samples were analyzed for EPA Method TO-15 VOCs in Air.

Landfill Gas Monitoring- Ambient Air

In April 2014 and June 2016, PADEP performed ambient air sampling at eight locations around the perimeter of the landfill using stainless steel Summa© canisters. Sampling locations are rotated every sampling event with a bias toward the nearby residential community. See Figure 4 for 2014 monitoring locations and Figure 6 for 2016 monitoring locations. All samples were analyzed for EPA Method TO-15 VOCs in Air. In 2016, one of the canisters "Summa 8," malfunctioned during the sampling event, and results are available for only the remaining 7 samples. Tables 4 and 5 provide a summary of the results of the 2014 and 2016 ambient air monitoring events. Only detected compounds are summarized in these tables, i.e. if a compound was not detected in any of the samples in a particular event, the compound is not listed in Tables 4 and 5.

Table 4
Summary of 2014 Ambient Air Monitoring (µg/m^3)

	EPA Carcinogenic RSL TR=1E-06	EPA Non-carcinogenic RSL THI=0.1	AA-1	AA-2	AA-3	AA-4	AA-5	AA-6	AA-7	AA-8
1-bromopropane	---	---	1.16	1.40	2.29	ND	ND	ND	ND	ND
Acetone		3200	17.52	8.78	18.06	7.21	14.55	15.90	8.16	15.72
acrolein		0.0021	**0.62**	**0.55**	**1.72**	ND	**0.84**	**1.17**	**0.29**	**1.48**
benzene	0.36	3.1	**2.02**	**0.44**	**0.48**	ND	ND	ND	ND	ND
chloromethane		9.4	1.70	1.78	1.73	1.27	1.86	1.30	1.83	1.41
Dichlorodifluoro-methane		10	3.24	3.40	3.36	2.89	3.56	3.09	3.66	3.03
Trichlorofluoro-methane	---	---	1.71	1.75	1.71	1.48	1.74	1.60	ND	1.51
MEK		520	1.25	0.70	1.65	0.54	1.86	2.12	0.70	2.17
methylene chloride	100	63	0.53	0.48	0.48	ND	ND	ND	ND	ND
propene		310	1.63	1.08	1.32	0.62	0.81	0.65	0.66	0.90
toluene		520	9.78	0.70	0.72	ND	ND	ND	ND	ND
carbon tetrachloride	0.47	10	ND	ND	ND	ND	ND	ND	**0.77**	ND
TCE	0.48	0.21	ND	ND	ND	ND	ND	ND	ND	**1.15**
1,2,4 trimethyl-benzene		0.73	**2.83**	ND	ND	ND	ND	ND	ND	ND
cyclohexane		630	0.48	ND	ND	ND	ND	ND	ND	ND
ethylbenzene	1.1	100	0.85	ND	ND	ND	ND	ND	ND	ND
m/p xylene		10	4.14	ND	ND	ND	ND	ND	ND	ND
o-xylene		10	1.53	ND	ND	ND	ND	ND	ND	ND
MTBE	11	310	0.92	ND	ND	ND	ND	ND	ND	ND
n-hexane		73	2.53	ND	ND	ND	ND	ND	ND	ND
n-heptane	---	---	0.82	ND	ND	ND	ND	ND	ND	ND

ND= Non-detect
May 2016 RSLs

Table 5 Summary of 2016 Ambient Air Monitoring (µg/m^3)

	EPA Carcinogenic RSL TR=1E-06	EPA Non-carcinogenic RSL THI=0.1	SUMM A-7	SUMM A-6	SUMM A-5	SUMM A-4	SUMM A-3	SUMM A-2	SUMM A-1
acetone		3200	6.19	13.33	ND	10	11.19	11.9	20.47
1-bromopropane	---	---	ND	ND	0.70	ND	ND	ND	ND
acrolein		0.0021	ND	**0.8**	**0.55**	**0.6**	**0.32**	**0.73**	**1.05**
chloromethane		9.4	0.87	0.81	0.87	1.24	0.87	1.12	1.24
Dichlorodifluoro-methane		10	2.92	2.77	2.92	3.02	2.87	2.82	2.97
propene		310	0.29	0.38	0.31	170.11	0.55	0.55	0.72
toluene		520	ND	0.72	ND	0.49	0.53	ND	ND
Trichlorofluoro-methane	---	---	1.29	1.24	1.24	1.24	1.18	1.18	1.18

ND = Non-detect
May 2016 RSLs

The 2014 and 2016 ambient air monitoring results were compared to the May 2016 Regional Screening Levels (RSLs). The RSLs are risk-based concentrations derived from standardized equations combining exposure information assumptions with EPA toxicity data. EPA considers RSLs to be protective of human health. RSLs are calculated for a Carcinogenic Target Risk of lE-06, and/or a Noncancer Hazard Index (HI) of 0.1. Tables 4 and 5 summarize the data from the two sampling events and compares them to the Regional Screening Levels.

In both the 2014 and 2016 ambient air and gas vent monitoring events, acrolein was detected in most of the samples at concentrations above the RSLs. However, EPA has determined that monitoring for acrolein is not accurate using EPA Method TO-15, and there are questions about the consistency and reliability of acrolein monitoring results. EPA believes the detection of low levels of acrolein are inaccurate due to limitations of the laboratory analysis and are not Site related.

Although exceedances of RSLs were noted for a few of the VOCs, no chemicals were detected in any ambient air samples at concentrations that would pose an unacceptable risk under a residential exposure scenario. Several chemicals measured directly at the on-site gas vents exceeded RSLs, sometimes by two orders of magnitude or more. However, these concentrations are not indicative of exposure under current land use conditions. Dilution of the vent gases appears to be occurring rapidly, as demonstrated by ambient air samples collected at the landfill. In summary, the results of PADEP's sampling of the landfill gas vents and perimeter ambient air monitoring at the Site show that the landfill gas emissions are not adversely impacting the ambient air quality.

Ambient air sampling at the Moyer's Landfill over the past ten years (2007, 2010, 2012, 2014 and 2016) demonstrate that the landfill gas is not significantly migrating off-site and impacting ambient air. Because of this, PADEP and EPA have determined that ambient air sampling at the landfill is no longer needed to show that the landfill gas emissions are not adversely impacting the ambient air quality.

Since the 1985 ROD requires that some form of monitoring occur to demonstrate that the landfill gas is not causing a hazard to the nearby community, sampling gas vents for methane at the landfill perimeter nearest adjacent homes will be performed during future sampling events. Methane concentrations below the statutory limits of 100% of the Lower Explosive Limit (which is 5% by volume for methane) will demonstrate that the landfill gas is not migrating and posing explosive risk to nearby residents.

At EPA's request, PADEP completed methane sampling of four passive gas vents closest to the residents at Moyers on May 16, 2017. Table 6 shows there were no detectable levels of methane found at these gas vents. Therefore, the landfill gas is not migrating beyond the landfill perimeter, and there is no risk to nearby residents.

Table 6 Summary of 2017 Gas Vent Monitoring

Location	%CH4	%CO2	%O2	%BAL
GV-20	0.0	0.7	20.3	79.1
GV-21	0.0	0.3	20.7	79.4
GV-31	0.0	0.2	20.6	79.3
GV-32	0.0	0.3	20.4	79.1

Site Inspection

The inspection of the Site was conducted on October 17, 2016 in order to assess the protectiveness of the remedy. The following personnel were in attendance during the Site inspection:

Sharon Fang, EPA Site RPM;
Andrew Haneiko, David Greaves, Jeff Thomas, EPA RPMs;
Josh Crooks, PADEP Site project manager;
Bonnie McClennen, PADEP;
Kim Scharl, EPA Community Involvement Coordinator;
Mark Leipert, EPA hydrogeologist; and
Katie Matta, EPA ecologist.

Since the cap had not been completely mowed at the time of the October inspection, Sharon Fang and Josh Crooks completed a follow-up inspection on November 3, 2016 once the mowing was complete.

A key component of the FYR at the Site is the physical inspection of the landfill cap, the leachate holding tanks, and the leachate collection system, fence, groundwater monitoring wells and landfill gas vents. During the October 17, 2016 inspection, the weather was sunny with a temperature around 70˚F. The inspection consisted of walking the perimeter fence line, observing erosion repairs being performed in the North Valley, inspecting the leachate holding tanks, locating the monitoring wells near the landfill cap, observing the seep in the South Valley, and viewing the farmhouse associated with the property.

During the November 3, 2016 follow-up inspection, the weather was light rain showers with a temperature around 60˚F. The inspection consisted of walking the recently mowed landfill cap,

inspecting the surface water detention structures, observing the completed erosion repairs in the North Valley and at the seep in the South Valley, and locating the upgradient monitoring wells near the Valley High development. No bulges or cracking of the landfill cap were evident during the inspection and no evidence of slope instability was observed. The vegetative cover appeared to be in satisfactory condition.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Yes. The review of relevant documents and reports and the Site inspection indicate that the remedy is functioning as intended by the 1985 ROD and 2000 and 2009 ESDs. The landfill cap and drainage structures are functioning properly with some maintenance issues, such as erosion and minor water pooling on benches. The leachate collection system has been recently renovated due to electrical issues and is being operated and maintained. Ambient air, gas vent, and groundwater monitoring data shows that contaminant levels are generally decreasing.

Institutional controls protecting the remedy and preventing use of the leachate from the Site are currently required by the 2009 ESD and implemented by a township ordinance. Site inspections confirm that the leachate is not being used; that there have been no earth moving activities on-site other than maintenance of the remedy; and that the land use has not changed. Thus, ICs are proving to be effective in ensuring the protectiveness of the remedy. Access controls, such as the fence and warning signs, are in place and continue to be monitored by PADEP and the local police. EPA, PADEP, and the township have noted evidence of active trespassing at the Site; however, there does not appear to be a complete exposure pathway to the waste or leachate to the trespassers.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Applicable or relevant and appropriate requirements identified in the 1985 ROD are still valid. These requirements were met during construction of the remedy and the remaining requirements are being achieved during O&M of the Site. While there have been changes in toxicity values and exposure assumptions since the 1985 ROD was issued, these changes do not affect the protectiveness of the remedy because contaminated material is beneath a cap, and impacted groundwater is not used as a drinking water source, and the remedy remains protective of human health and the environment.

QUESTION C: Has any **other** information come to light that could call into question the protectiveness of the remedy?

No.

The Site is not in the 100 or 500 year FEMA flood zone; therefore flooding is not a concern for the Site. Erosion has been a concern at the Site in the past and an increase in intensity and frequency of precipitation events should be taken into consideration when repairing damage due to erosion.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU1, OU2

OTHER FINDINGS

In addition, the following are recommendations that were identified during the FYR and but do not affect current and/or future protectiveness:

- The O&M Plan should be updated to reflect the new owner's responsibility for performing O&M on behalf of PADEP.

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement	
Protectiveness Determination: Protective	*Planned Addendum Completion Date:* Not applicable
Protectiveness Statement: This third FYR for the Site finds that the remedy has been constructed in accordance with the requirements of the 1985 ROD and 2000 and 2009 ESDs and is functioning as designed. The immediate threats have been addressed though capping the landfill and collecting and properly disposing of the leachate. Since the Remedial Actions at both OUs are protective, the Site is protective of human health and the environment. Long-term protectiveness of the remedy will be maintained by continuing to perform O&M of the landfill cap and leachate collection system; monitoring of landfill gas; and enforcing the institutional controls.	

VIII. NEXT REVIEW

The next FYR for the Site is required five years from the completion date of this review.

REFERENCE LIST

U.S. Environmental Protection Agency, Record of Decision, Moyer's Landfill Superfund Site, Collegeville, Montgomery County, Pennsylvania, September 1985.

IMS Engineers Architects, Remedial Investigation – Feasibility Study, Moyer's Landfill Site, Collegeville, Pennsylvania, January 1986.

Paul C. Rizzo Associates, Inc., Site Maintenance Plan, Moyer's Landfill Superfund Site, Montgomery County, Pennsylvania, January 1991.

U.S. Army Corps of Engineers, Remedial Action Report, Moyer's Landfill Superfund Site, Montgomery County, Pennsylvania, December 1996.

U.S. Environmental Protection Agency, Preliminary Close Out Report, Moyer's Landfill Superfund Site, Lower Providence Township, Pennsylvania, September 2002.

U.S. Army Corps of Engineers, Remedial Action Report, Moyer's Landfill Superfund Site, Montgomery County, Pennsylvania, April 2004.

U.S. Environmental Protection Agency, Second Five-Year Review Report, Moyer's Landfill Superfund Site, Lower Providence Township, Pennsylvania, August 2012.

Commonwealth of Pennsylvania Department of Environmental Protection, Moyer's Landfill NPL Site Operations and Maintenance Plan, Lower Providence Township, Montgomery County Pennsylvania, February 2012.

Commonwealth of Pennsylvania Department of Environmental Protection, 2014 Operations and Maintenance Report, Moyer's Landfill NPL Site, Lower Providence Township, Montgomery County Pennsylvania, April 1, 2015.

Commonwealth of Pennsylvania Department of Environmental Protection, 2015 Operations and Maintenance Report, Moyer's Landfill NPL Site, Lower Providence Township, Montgomery County Pennsylvania, January 21, 2016.

Commonwealth of Pennsylvania Department of Environmental Protection, 2016 Operations and Maintenance Report, Moyer's Landfill NPL Site, Lower Providence Township, Montgomery County Pennsylvania, January 25, 2017.

FIGURES

Figure 1

Site Location Map

Moyers Landfill Superfund Site

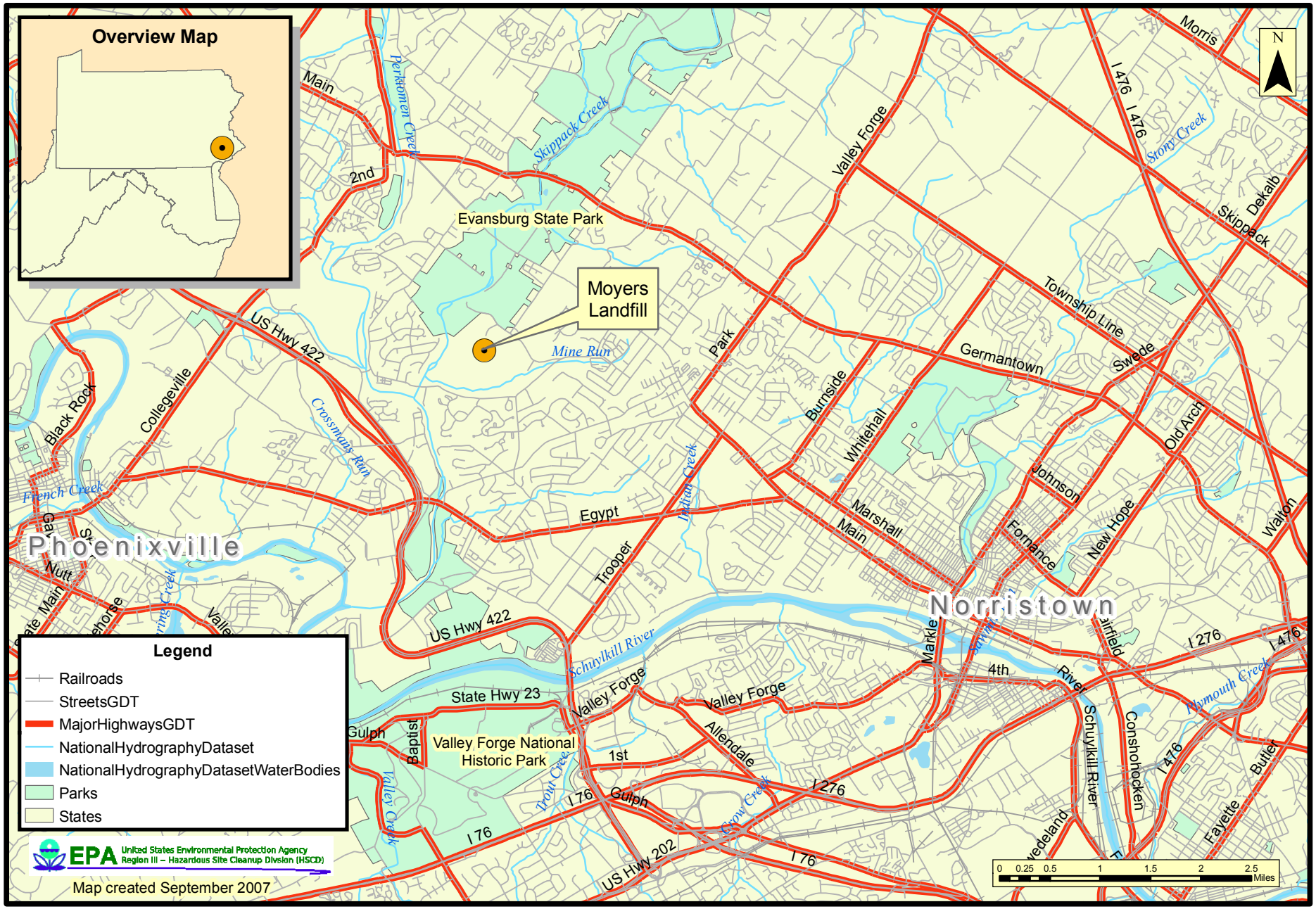


Figure 2

Site Layout Map, Well Locations and Site Features
Moyers Landfill Superfund Site

Figure 3

Erosion Repair Areas 2014
Moyers Landfill Superfund Site

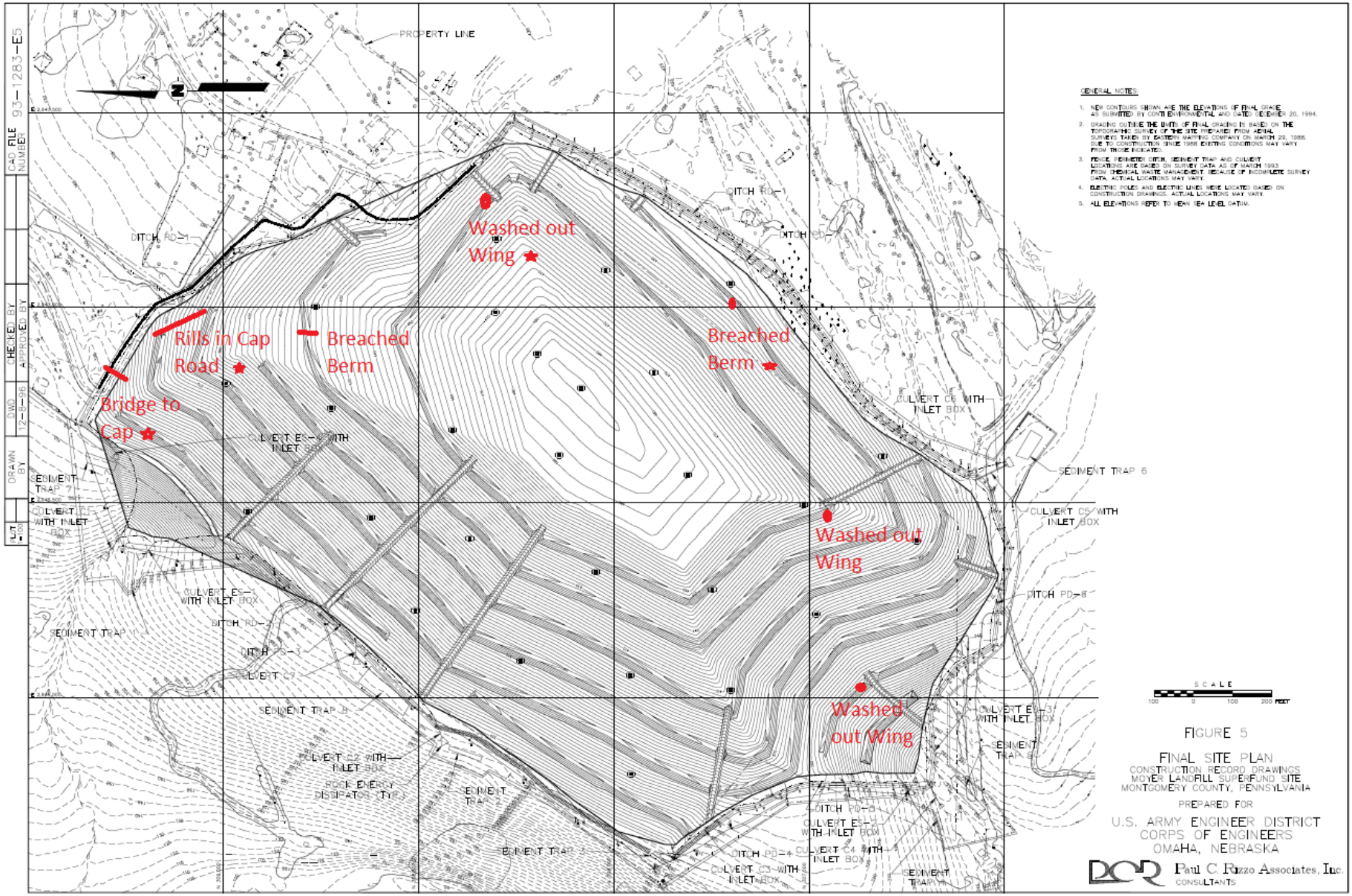


Figure 4

Gas Vent & Ambient Air Sampling Locations 2014
Moyers Landfill Superfund Site

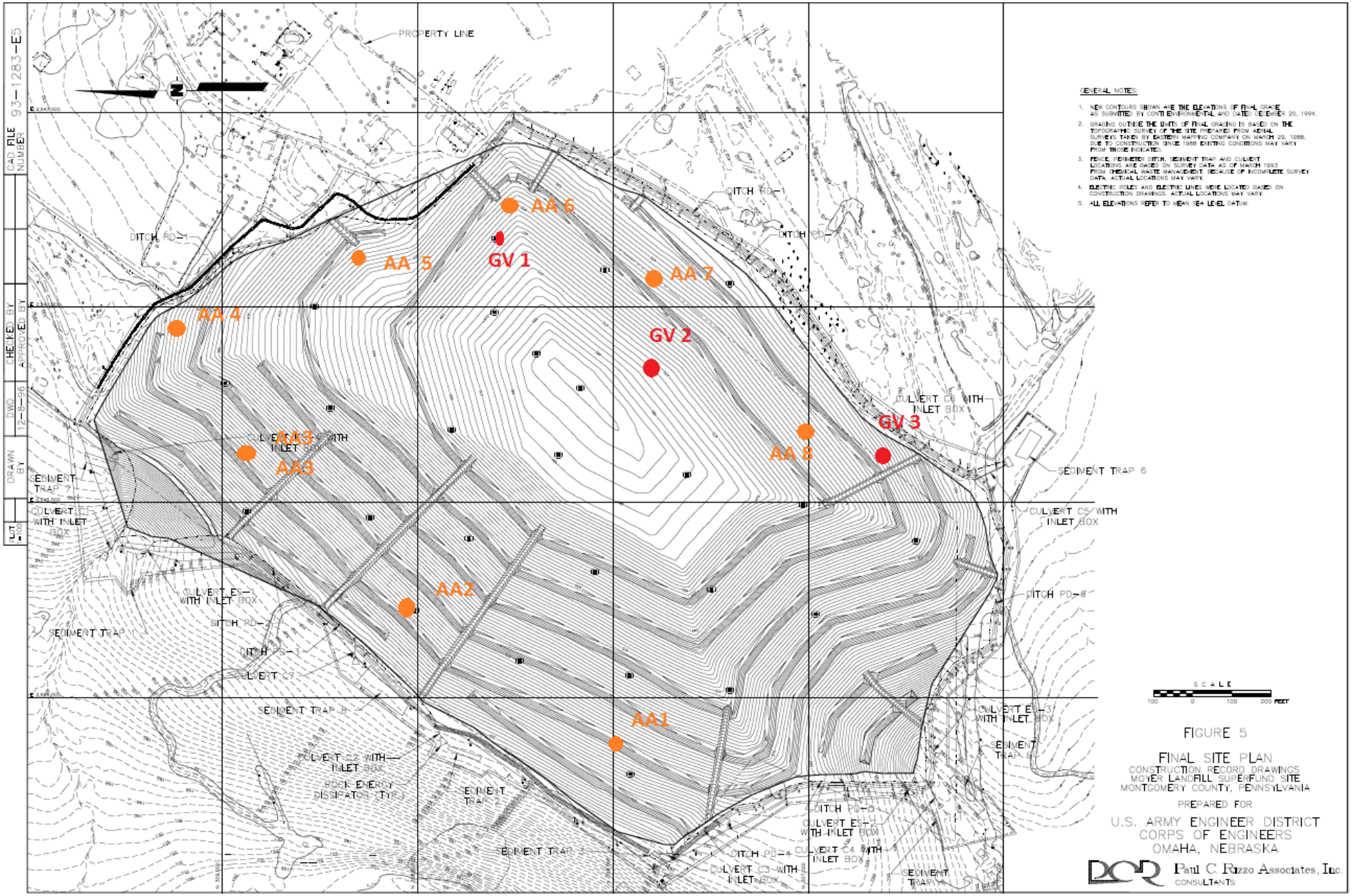


Figure 5

Gas Vent Sampling Locations 2016
Moyers Landfill Superfund Site

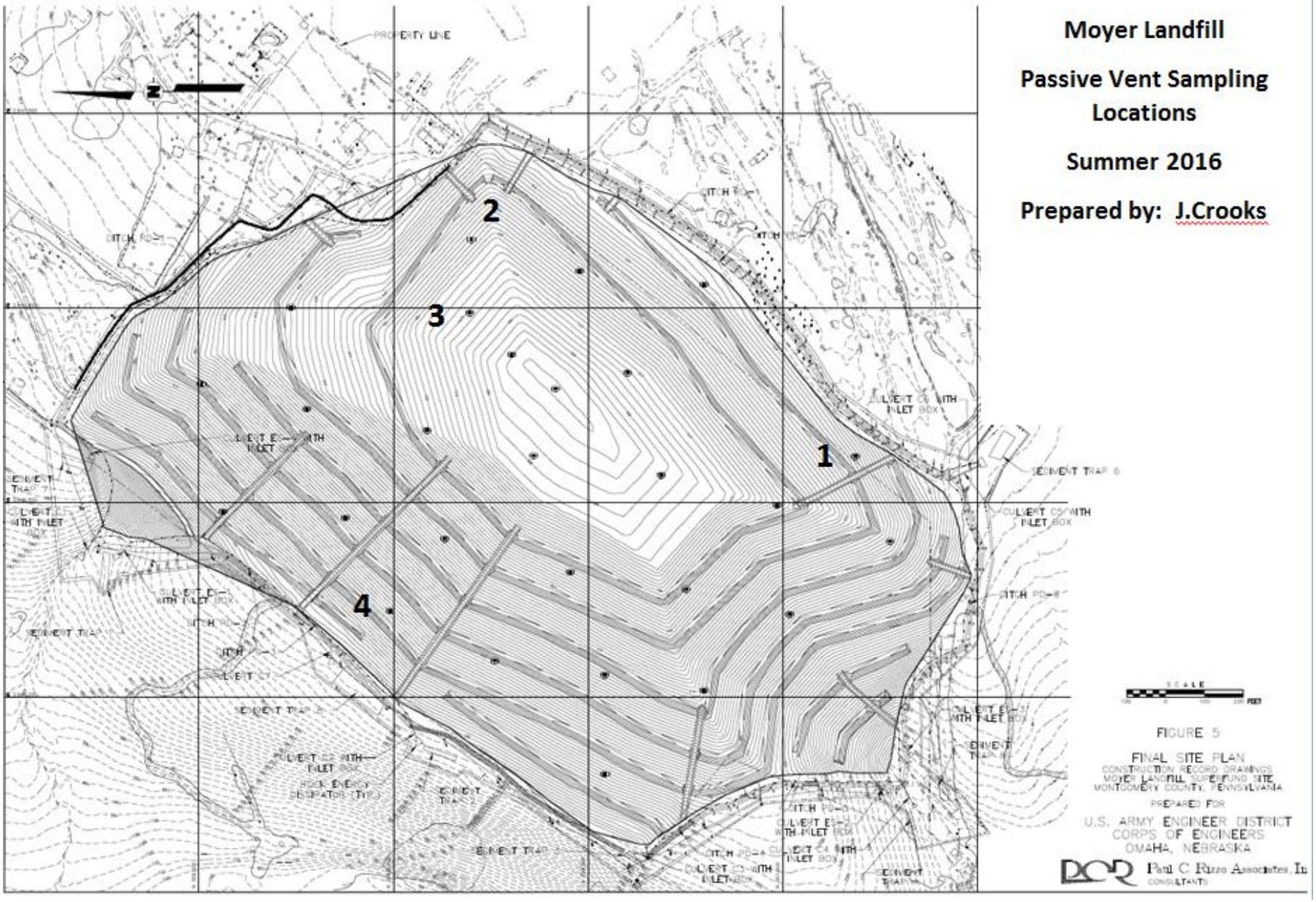


Figure 6
Ambient Air Sampling Locations 2016
Moyers Landfill Superfund Site

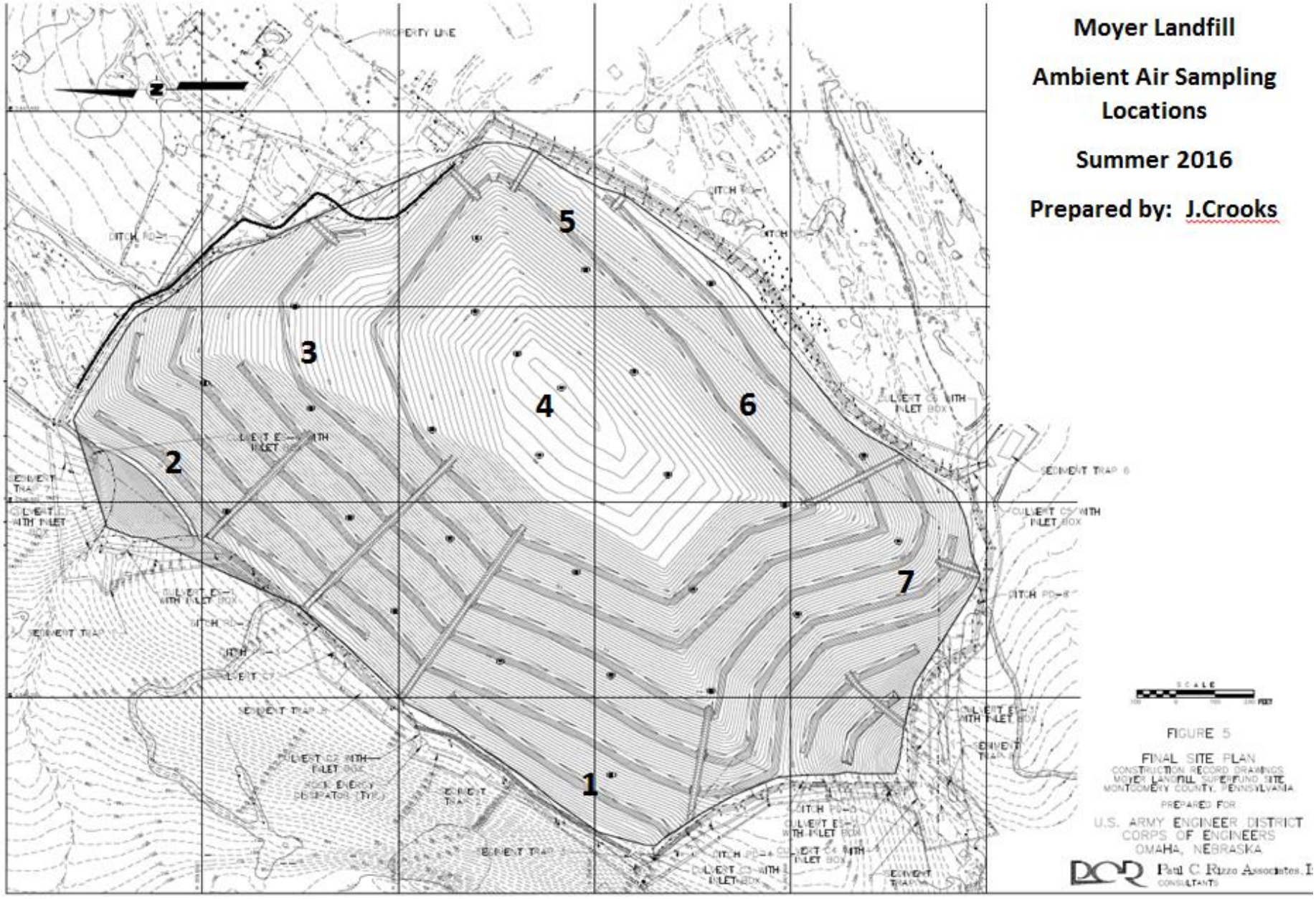
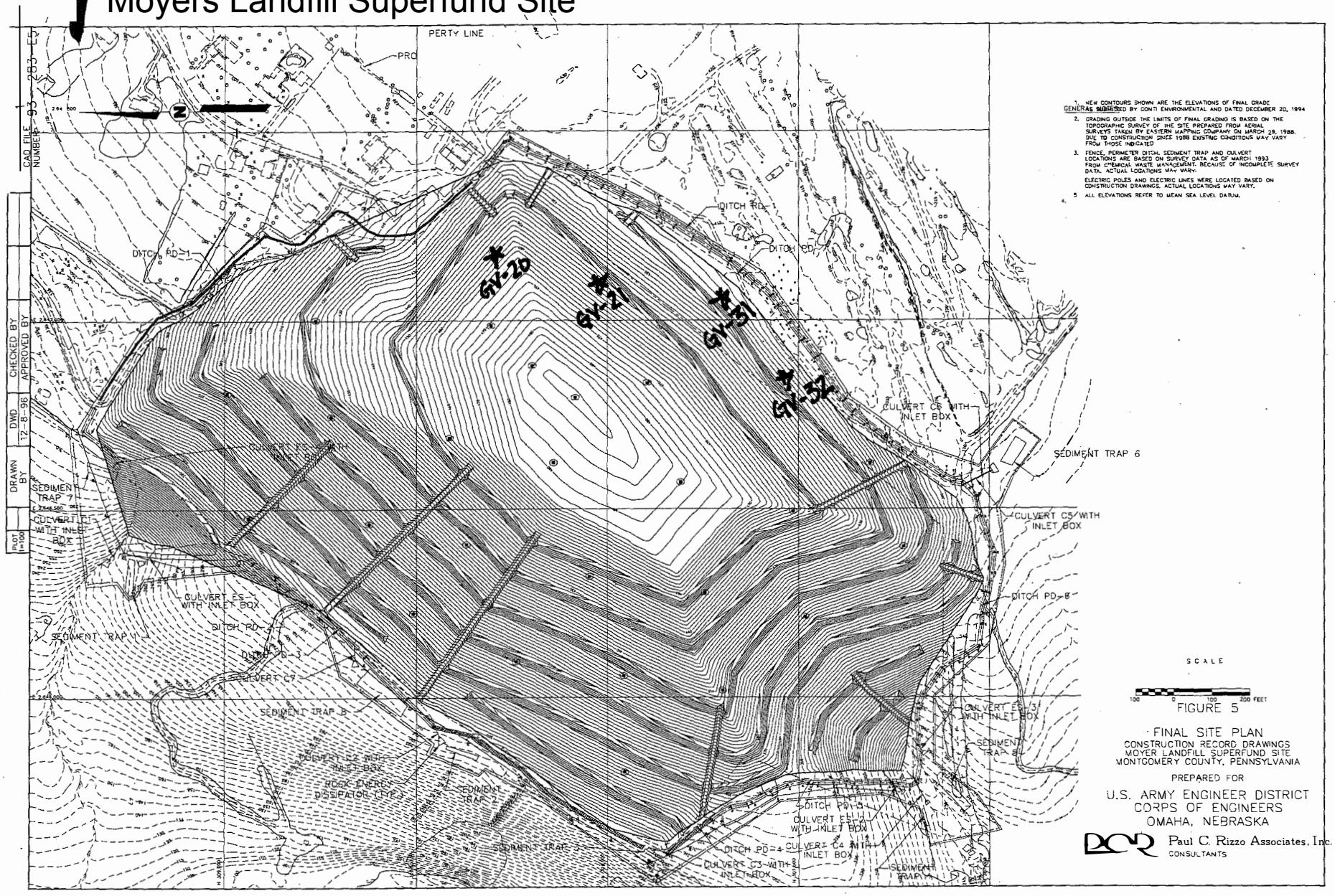


Figure 7

Gas Vent Sampling Locations 2017
Moyers Landfill Superfund Site



Attachment 1

EPA REVIEWS CLEANUP AT MOYERS LANDFILL SITE

The U.S. Environmental Protection Agency (EPA) is conducting a Five-Year Review of the Moyers Landfill Superfund Site located in Eagleville, Montgomery County. EPA inspects sites regularly to ensure that cleanups conducted remain protective of public health and the environment. This site was deleted from the National Priorities List, or NPL, in 2014 when all cleanup activities were completed. EPA's most recent review of the site in 2012 determined that the remedy continues to be fully protective of public health and the environment in the long-term. Detailed findings from this review will be available by August 2017.

To access results of the review (starting August 2017):
http://epa.gov/5yr

To read detailed site and contact information:
https://go.usa.gov/xXAjD

To ask questions or provide site information:
Contact: Gina Soscia Phone: 215-814-5538
Email: soscia.gina@epa.gov

Protecting public health and the environment