COMBINED REMEDIAL INVESTIGATION/FINAL ACT 2 REPORT

For the 2019 Naphtha Release Area

FORMER PHILADELPHIA ENERGY SOLUTIONS REFINERY
3144 West Passyunk Avenue, Philadelphia, PA
Passyunk Township, Philadelphia County

Prepared for:

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1.0 INTRODUCTION

On behalf of Philadelphia Energy Solutions Refining and Marketing LLC (PESRM), Langan Engineering and Environmental Services, Inc. (Langan) has prepared this Combined Remedial Investigation Report/Final Report (RI/Final Report) for soils at a portion of the former Philadelphia Energy Solutions Refinery (Former PES Refinery), located at 3144 West Passyunk Avenue, Philadelphia, Philadelphia County ("Site"). This report addresses remediation of the light naphtha release which occurred on February 22, 2019 within the Former PES Refinery (Figure 1).

The light naphtha release occurred within the broader area designated as Area of Interest 7 (AOI 7), shown on Figure 2, as identified in prior reporting submitted on behalf of Evergreen Resources Management Group, a series of Evergreen Resources Group (LLC) (Evergreen). This report is being submitted pursuant to a Notice of Intent to Remediate (NIR) the light naphtha discharge area only on behalf of Philadelphia Energy Solutions Refining and Marketing LLC and is not associated with the ongoing Land Recycling Program work initiated in 2006 and conducted by Evergreen to address legacy environmental impacts at the Former PES Refinery.

1.1 Overview of 2019 Release and Response Actions

On February 22, 2019, a reported 53,298 gallons of product identified as light naphtha was released to the ground surface from defects in above-ground piping associated with former refinery process Unit 137 near the location of the former Unit 136 (referred to as the "Unit 136 Area"). Unit 137 is referred to as the "Crude Unit". Prior to shut down in 2019, the purpose of the Crude Unit was to separate raw crude oil into its desired components. Once separated, these components were sent to downstream units for further processing. The discharged substance, light naphtha, is a petroleum product similar to gasoline, which was being transported from Unit 137 to act as feed stock for downstream refining operations.

The released product was contained by site topography and existing drainage features. The product was observed by Stantec Consulting Services, Inc. (Stantec) to flow to the south along surface grading, parallel to the piping run and then to the east toward a sewer catch basin (Stantec, March 2020). The area of impacted soil is shown shaded in green on Figure 3.

Following the release, refinery personnel and subcontractors performed immediate interim remedial actions to mitigate potential impacts from the release. The response actions included removal of liquids via vacuum truck from the storm sewer and culvert and from test pits advanced

along the compromised product line. The removed water/product mixture was stored in a waste oil tank and then treated via the on-site waste water treatment system. The defective section of product line was replaced with new above-ground piping.

In March 2019, Stantec collected 20 soil samples in the vicinity of the light naphtha release. Samples from the area outside and surrounding the release were collected based on visual observation of the extent of the soil impacts from the light naphtha release. The samples were analyzed for the unleaded gasoline parameters ("unleaded gasoline short list") listed in Table IV-9 Short List of Petroleum Products from the Pennsylvania Department of Environmental Protection (PADEP) *Storage Tank Program Guidance* (March 18, 2008). The purpose of the soil sampling was to confirm the extent of the release, as depicted on Figure 3.

Between November 25 and December 12, 2019, PES conducted an excavation of the soils impacted by the release of light naphtha. A total of 376.9 tons of soil were removed and disposed offsite at Clean Earth of New Castle, Delaware, a licensed treatment, storage and disposal facility. Manifests are included in Appendix C. Following post-excavation soil sampling, the excavation was backfilled with soil sourced from Lot 17 (at the refinery) that was eligible for reuse according to the May 23, 2013 *Onsite Soil Reuse Plan.* This document was filed with the PADEP in 2013 and was established as the protocol for soil reuse at the time of the remediation described above.

Post-excavation soil sampling was conducted by Stantec using systematic random sampling as required by 25 Pennsylvania Code Chapter 250 *Administration of the Land Recycling Program* ("Chapter 250") § 205.703(c). Twelve samples were collected from the excavation base and sidewalls as shown on Figure 3. The samples were analyzed for unleaded gasoline short list parameters. The post-excavation soil sample results identified no concentrations of tested analytes greater than the PADEP Soil Statewide Health Standards (SWHS) which are the Medium Specific Concentrations (MSCs), (non-residential, used aquifer) standards presented in Appendix A, Tables 3 and 4 of Chapter 250 as discussed in greater detail in Section 4.1.

1.2 Purpose

The purpose of this report is to demonstrate attainment of a Statewide Health Standards and obtain a release of environmental liability from the PADEP under the provisions of the Land Recycling and Environmental Standards Act, the Act of May 19, 1995, P.L. 4, No. 2 for petroleum-related compounds identified in soil at the Site related to the 2019 naphtha release. The interim and final response actions taken to address the release were successful at remediating the soil

impacts from the release. Considering the analytical results for remedial investigation and post excavation soil samples, attainment of the non-residential Statewide Health Standards has been demonstrated. These data and conclusions are further detailed herein.

As presented in greater detail herein, due to the timeliness of the remediation and the findings of completed soil sampling demonstrating a separation distance between soil and groundwater, groundwater is not a media of concern for this release.

1.3 Report Organization

This report is organized following guidelines for preparing an Act 2 Final Report outlined in Section II B-6 of the Pennsylvania Land Recycling Program Technical Guidance Manual. The report is organized as follows:

1.0 Introduction
2.0 Site Description
3.0 Summary of Discharge and Interim and Final Response Actions
4.0 Site Characterization
5.0 Site Conceptual Model
6.0 Ecological Screening Assessment
7.0 Demonstration of Attainment
8.0 Public Notices
9.0 Signatures
10.0 References

2.0 SITE DESCRIPTION

This section describes Site and vicinity physical features and provides Site ownership and operational information. A Site Location Map based on the United States Geological Survey Philadelphia Quadrangle (April 18, 2019) is included as Figure 1, and an aerial Site Plan based on August 30, 2020 Nearmap imagery is included as Figure 2.

2.1 Site Location and Setting

The Site is located at 3144 West Passyunk Avenue in Philadelphia, Pennsylvania. Unit 137 at the Former PES Refinery is located approximately 0.63 miles north-northwest of Penrose Avenue on the southeastern portion of the former Philadelphia Energy Solutions (PES) Refinery. The center

of the light naphtha release remediation is located at geographic coordinates N 39°54'28" latitude and W 75°12'49" longitude. The remediation and assessment encompassed approximately 0.89 acres within the larger 1,300-acre former PES Refinery that is designated as Philadelphia County Parcel ID's 046S070064 and 046S070063.

2.2 Site Ownership and Operation

The former PES Refinery is comprised of multiple parcels that consists of two formerly separate refining operations known as Point Breeze Refinery and Girard Point Refinery. The refinery site was first used for petroleum related uses as far back as 1866. The facility produced mainly transportation fuels such as gasoline and diesel fuel, as well as heating fuels, until operations ceased in June 2019. On June 21, 2020, HRP Philadelphia Holdings, LLC (HRP) acquired ownership interest in PES Holdings, LLC, which is now the single owner of Philadelphia Energy Solutions Refining and Marketing LLC. Philadelphia Energy Solutions Refining and Marketing LLC is conducting remediation of the 2019 naphtha release.

Past operations at the refinery included refining, product distribution, and storage facilities. The facilities, structures and other improvements on the property are currently being demolished as part of the planned redevelopment of the property. In February 2019, the light naphtha discharge occurred from an aboveground pipe associated with Unit 137. The discharge occurred in the Former Unit 136 area. No active operations or ongoing storage of petroleum products, other than aboveground transmission lines, were occurring in this former Unit 136 area at the time of the release.

3.0 SUMMARY OF DISCHARGE AND INTERIM AND FINAL RESPONSE ACTIONS

In February 2019, PES restarted Unit 137 after maintenance activities and when an aboveground product line was charged, light naphtha was released out of two defects. The location of the line defects which resulted in the release are shown on Figure 3. Based on a review of the emergency response forms included in Appendix A, 53,298 gallons of light naphtha was released to the ground surface and was observed generally to flow to the south along surface grading , parallel to the piping run and then to the east toward a sewer catch basin. PES performed immediate interim remedial actions to mitigate potential impacts from the release in accordance with facility protocol. The response actions included removal of liquids via vacuum truck from the storm sewer and from test pits advanced along the migration path of the release from the compromised product line. The recovered liquids were trucked to GP-272, a three million-gallon waste oil tank

within the Girard Point area of the Former PES Refinery where they were stored until eventually being treated via the on-site waste water treatment system. The damaged section of product line was replaced with new piping.

In March 2019, Stantec conducted remedial investigation activities that included sampling of soils on March 22, 2019 and March 26, 2019 around the visibly-approximated naphtha release area. Between November 25 and December 12, 2019, an excavation was conducted of the areas where soils had been visually identified as impacted by the 2019 naphtha release. 376.9 tons of soil were removed and disposed offsite at Clean Earth of New Castle, Delaware, a licensed treatment, storage and disposal facility. Manifests are included with Appendix C. Following post-excavation soil sampling performed on December 12, 2019, the excavation was backfilled with soil sourced from Lot 17 (at the refinery) that was eligible for reuse according to the *Onsite Soil Reuse Plan,* dated May 23, 2013.

As documented in a November 13, 2020, report prepared by Stantec (Appendix A), during excavation activities, the field team observed evidence of additional historical petroleum impacts in the subsurface which were not related to the 2019 naphtha release. Four buried drums were encountered at approximately 3 to 4 feet below ground surface (ft bgs) near the central area of the excavation. The drums were observed to be in a deteriorated condition, and an unknown viscous product was observed. The drums and surrounding soil were removed by Evergreen. After the drums were removed, the excavation and post-excavation samples to address the naphtha release were completed by Stantec. The area of excavation is shown on Figure 3.

4.0 SITE CHARACTERIZATION

The following section summarizes the soil investigation completed in the area of the 2019 naphtha release. In preparing this RI/Final Report, Langan reviewed the following documents related to 2019 naphtha release and the ongoing investigation and remediation activities being conducted by Evergreen:

- GHD Remedial Investigation Report AOI 7 (November 2017)
- Stantec Unit 137 Line Release: Release Assessment Report (March 12, 2020)
- Stantec Unit 137 Line Release in the Area of Former 136 Unit: Investigation Summary (November 13, 2020)
- Release Response Forms

Copies of the documents listed above are included as Appendix A.

To characterize soil conditions in and around the 2019 naphtha release area, Langan reviewed two sets of soil sample data collected by Stantec: 1) analytical results for 20 soil samples collected in March 2019 for remedial investigation purposes at locations surrounding the visibly-approximated extent of the naphtha release area; and 2) analytical results for 12 post excavation soil samples collected after the completion of the remedial excavation on December 12, 2019. A summary of these results compared to Pennsylvania Act 2 remediation standards is presented below.

4.1 Selection of Remediation Standards

Soil analytical results, including historic data near the area of the 2019 naphtha release as reported in the GHD Remedial Investigation Report AOI 7 (November 2017) and recent soil samples collected in the area of the 2019 naphtha release on March 22 and 26, 2019 and December 12, 2019 were compared to the current PADEP non-residential Statewide Health Standards (SWHS). In accordance with the methodology specified in Chapter 250 §305 for soil, Langan selected the appropriate Medium-Specific Concentration (MSC) for each petroleum compound that was analyzed. The soil analytical results discussed in this report were compared to the following:

- PADEP non-residential direct contact (0-2 ft bgs) MSCs as published in the second and third MSC column of Chapter 250, Appendix A, Tables 3a (organics) and 4a (inorganics).
- PADEP non-residential direct contact (2-15 ft bgs) MSCs as published in the second and third MSC column of Chapter 250, Appendix A, Tables 3a (organics) and 4a (inorganics).
- PADEP non-residential Soil-to-Groundwater MSCs for a Used Aquifer (Total Dissolved Solids (TDS) < 2,500 milligrams per liter [mg/L]), which is the higher of the 100x Groundwater and Generic Soil-to-Groundwater MSCs as published in the third and fourth MSC columns of Chapter 250, Appendix A, Tables 3b (organics) and 4b (inorganics).

Soil data were compared to both the direct contact and soil-to-groundwater MSCs because Site soil samples were collected from unsaturated soils. The more stringent of the direct contact and soil-to-groundwater MSCs was selected as the appropriate "non-residential SWHS" (SWHS MSC) comparison criterion for each petroleum compound. Table 1 below provides a comparison of the screening value options and the determined SWHS values

Table 1: Comparison of Soil Screening Options

Non-residential Direct Contact MSCs (0-2 feet)	Non-residential Direct Contact MSCs (2-15 feet)	Compound Name	Non-residential Soil-to-Groundwater MSCs (100x)	Non-residential Soil-to-Groundwater MSCs (Generic Value)
560	640	1,2,4-trimethyl benzene	6.2	**35**
10000	10000	1,3,5-trimethyl benzene	120	**210**
290	330	benzene	**0.5**	0.13
890	1000	ethylbenzene	**70**	46
10000	10000	isopropylbenzene	350	**2500**
8600	9900	MTBE	**2**	0.28
760	190000	naphthalene	10	**25**
10000	10000	toluene	**100**	44
8000	9100	xylenes	**1000**	990

Bold represents the SWHS used, Data Source: Analytical database provided by Stantec.

Methodologies from the *Land Recycling Program Technical Guidance Manual* (TGM) Section IV (last updated January 19, 2019) were used to evaluate the vapor intrusion pathway using post excavation soil data collected at the naphtha release area. The soil VI screening values (SVSOIL) are the higher of the generic soil-to-groundwater numeric values (Chapter 250, Appendix A, Table 3B) and calculated soil screening values. As indicated in Section IV of the TGM: *the generic soil-to-groundwater numeric values are considered appropriate for VI screening because soil contamination that is unable to impact aquifers in excess of groundwater MSCs is also unlikely to pose an excess inhalation risk*. Table 2 below provides a comparison of the screening value options and the determined SVSOIL values.

Table 2: Comparison of Soil Vapor Screening Options

Non-residential Soil-to-Groundwater MSCs	Compound Name	Non-residential soil VI screening values
35	1,2,4-trimethyl benzene	**35**
210	1,3,5-trimethyl benzene	**210**
0.5	benzene	0.13
70	ethylbenzene	46
2500	isopropylbenzene	**2500**
2	MTBE	1.4
25	naphthalene	**25**
100	toluene	44
1000	xylenes	990

Bold represents the SVSOIL used, Data Source: Analytical database provided by Stantec

4.2 Remedial Investigation

In March 2019, Stantec mobilized to the site to perform a remedial investigation of the area around the naphtha discharge. The area shaded in green on Figure 3 shows the extent of observed staining of soil following the discharge. Stantec collected 20 soil samples from 20 soil borings (AOI7-BH-01 through AOI7-BH-20) around the visible area of the release in order to confirm and differentiate the extent of the potential impact from the 2019 naphtha release from known pre-existing petroleum impacts that stem from the history of petroleum storage at the former PES Refinery. As reported in their November 13, 2020 summary, Stantec hand-augured borings to 0.5 to 3 ft bgs, above the shallow water table. Soil boring locations are presented on Figure 4. Unsaturated soil samples for laboratory analysis were collected from the 0.5 to 2 ft-interval and analyzed for the PADEP unleaded gasoline short list parameters. Soil samples were submitted to Pennsylvania-certified Eurofins Lancaster Laboratories Environmental in Lancaster, Pennsylvania for analysis of VOCs by EPA SW-846 Method 8260B.

Of the 20 samples collected from within and around the perimeter of the observed area of impacts related to the 2019 naphtha release, benzene was detected at concentrations greater than the non-residential SWHS MSCs in four soil samples, and toluene was detected at concentrations greater than the SWHS MSCs in one soil sample. Results for the compounds with concentrations greater than the SWHS MSCs are summarized in Table 3 below. The laboratory analytical reports are included as Appendix B and the full results comparing to SWHS MSC is included in Table 4.

Table 3: Summary of Release Area Spill Investigation Sampling Exceedances

Compound Name	Benzene	Toluene
Non-Res SWHS MSC (0-2)	**0.5**	**100**
Non-Res SWHS MSC (2-15)	*0.5*	*100*
Sample ID: depth range (ft bgs)	**Report Value (mg/kg)**	
AOI7-BH-08-2019: 0.25-0.5	***40***	***130***
AOI7-BH-13-2019: 1.5-2	***1.2***	1
AOI7-BH-15-2019: 1.0-1.5	***8.3***	12
AOI7-BH-16-2019: 1.0-1.5	***1.7***	4.3

mg/kg = milligrams per kilogram, Data Source: Analytical database provided by Stantec

The four samples summarized in Table 3 above that were found to have concentrations of benzene (four samples) and toluene (one sample) greater than the non-residential SWHS for soil were collected from borings that are located outside of the area reported by Stantec to be visibly

associated with the light naphtha release. The benzene and toluene concentrations in these borings are similar to concentrations detected during historical investigations conducted by GHD on behalf of Evergreen and documented in the Remedial Investigation Report AOI 7 (November 2017). As shown on Figure 5, samples collected prior to the 2019 naphtha release indicated concentrations of petroleum constituents in soil greater than non-residential SWHS MSCs. Thus, the benzene and toluene exceedances identified in Table 3 are consistent with the pre-release conditions in this area and do not appear to be indicative of further impacts resulting from the 2019 naphtha release.

4.3 Post Excavation Soil Sampling

Post-excavation soil sampling was conducted on December 12, 2019, after completing the remedial excavation described in Section 3.0 by Stantec. Stantec used systematic random sampling as required by 25 Pennsylvania Code Chapter 250 *Administration of the Land Recycling Program* ("Chapter 250") § 205.703(c) to locate the samples that were collected and analyzed. Twelve samples were collected at depths ranging from 2 ft bgs to 4.5 ft bgs from the excavation base and sidewalls as shown on Figure 3. The samples were analyzed for unleaded gasoline short list parameters.

Analytical results for the post-excavation soil sample collected indicated that no concentrations of tested analytes were reported above the non-residential SWHS MSCs. Analytical results are summarized in Table 5.

4.3.1 Post-Excavation Soil Sample Vapor Intrusion Evaluation

An evaluation of the vapor intrusion pathway in accordance with the *Land Recycling Program Technical Guidance Manual* Section IV (last updated January 19, 2019) was performed for the post-excavation soil samples collected and analyzed. The sampled soils are within 5 ft bgs, which is the depth interval discussed in Section IV of the TGM) (Jan 2019). Petroleum hydrocarbons typically biodegrade under both anaerobic and aerobic conditions and oxygen content is generally higher in surface and shallow subsurface soils. While there is an expectation of reasonably high potential for rapid volatilization, attenuation and degradation of VOCs in these shallow post-excavation sampled soil areas, future receptors and future complete migration pathways are first evaluated by comparing results to non-residential SVSOIL screening levels, as shown in Table 6.

Post-excavation soil sample analytical results were all below the SVSOIL screening criteria. Vapor intrusion is not considered a pathway of concern for contaminants in soils at the 2019 naphtha release area.

5.0 CONCEPTUAL SITE MODEL

The Conceptual Site Model provides physical site conditions (e.g., geology and hydrogeology), the nature and extent of impacts, and consideration of sources and exposure pathways.

5.1 Physical Setting

This section details the physical setting and hydrogeological characteristics of the Site. A Site Plan is included as Figure 2.

5.1.1 Topography and Drainage

Ground surface elevation in the AOI 7 area ranges from a high of 23 feet above mean sea level (amsl) at the northeast corner of the Site to a low of 18 feet amsl at the southern end of the Site. Topographic relief at the Site is approximately five feet, and the ground surface generally slopes to the southwest, which is the expected direction of overland storm water flow. One sewer catch basin is located on the southeastern side of the 2019 naphtha release area. Various catch basins, bulkheads and numerous active light non aqueous phase liquid (LNAPL) recovery systems locally influence the flow of shallow groundwater throughout the Site.

The closest surface water feature to the Site is the Schuylkill River, which is located approximately 0.05 miles west of the 2019 naphtha release area. The Schuylkill River flows north-south through the former PES Refinery.

5.1.2 Regional Surficial and Bedrock Geology

In general, the sedimentary record documented in the GHD Remedial Investigation Report AOI 7 (November 2017) for the former PES Refinery is complex, largely incomplete, and under-represented by only Cretaceous and Quaternary deposits, separated by a regional disconformity.

The Atlantic Coastal Plain is a physiographic province that is defined as having relatively flat topography underlain by a characteristic wedge of unconsolidated sediments that thicken in a southeasterly direction, away from sediment source areas in the Appalachian Mountains. These

sediments were deposited atop a sloping bedrock surface in complex fluvial, estuarine, and marginal marine environments along the passive Atlantic margin and primarily consist of anthropogenic fill. As reported in the GHD Remedial Investigation Report AOI 7 (November 2017), boring log records from deep holes drilled at the Former PES Refinery indicate that schist is present beneath the Coastal Plain and that small paleochannels are present in the southern portion of the former PES Refinery, an extension of the League Island trough.

Cretaceous age deposits are the oldest sedimentary deposits in the area and are configured in a southeasterly-thickening wedge. Quaternary deposits at the former PES Refinery consist of Halocene Alluvium, ranging in thickness from a few feet at higher elevations, away from the present Schuylkill and Delaware River estuaries, to approximately 15 feet within the former floodplains of buried tributary stream, according to the GHD Remedial Investigation Report AOI 7 (November 2017). Trenton gravel generally ranges in thickness from a few feet up to approximately 30 feet near the Philadelphia Refinery. The findings in the GHD Remedial Investigation Report AOI 7 (November 2017) were reviewed against literature presented in Appendix F and G and were found to be in agreement.

5.1.3 Site Geology and Hydrogeology

Langan reviewed previous data and state and federal databases to define the current geologic conditions in the area of the Site. Site-specific geology, as reported in the GHD Remedial Investigation Report AOI 7 (November 2017), consists of several units from deep to shallow: Wissahickon formation (bedrock), Farrington Sand unit, Middle/Lower Clay, Trenton Gravel, and recent fill/alluvium. The Middle/Lower Clay separates the shallow and deeper aquifers. Historical investigations conducted at the former PES Refinery have primarily focused on two saturated zones, including shallow groundwater (occurring within the Trenton Gravel/alluvium unit) and deep groundwater (occurring within the Farrington Sand unit). The Farrington Sand unit consists of green, brown, orange and/or red, fine gravel and coarse sand that grades upward into medium to fine sands and contains thin layers of silts and clays. The Middle/Lower Clay ranges in thickness from 5 to 65 feet and the Farrington Sand ranges in thickness from 10 to 70 feet across the AOI 7 area.

Shallow groundwater tends to naturally flow southwest towards the Schuylkill River, but varies across the larger PES Refinery and is influenced by active recovery systems, bulkheads along the Schuylkill River and tidal influence due to historic Schuylkill River marshes and tidal creeks. Based on a review of gauging data provided in the GHD Remedial Investigation Report AOI 7 (November

2017), monitoring wells near the 2019 naphtha release area reveal an average depth to groundwater of 4.92 ft bgs. A review of gauging data collected in 2019 and 2020 from the six wells located nearest the 2019 naphtha release area reveal that the depth to groundwater ranges from 3.98 to 6.43 ft bgs. These six wells include C-105, C-106, C-139, C-104, C-63, and C-98 as shown on Figure 5 in relation to the naphtha release area.

5.2 Release, Migration Path, and Nature and Extent of Impacts

The release involved 53,298 gallons of product identified as light naphtha from defects in above-ground piping associated with Unit 137 to the ground surface near the location of the former Unit 136 (referred to as the "Unit 136 Area"). The potential migration and extent of the release were contained by site topography and existing drainage features. Product was observed generally to flow to the south along surface grading, parallel to the piping run, then east toward a sewer catch basin which collected the released product. The area of visibly stained surface soil is shaded in green on Figure 3. The compounds of concern associated with the naphtha release are the PADEP unleaded gasoline short list parameters, which are benzene, toluene, ethylbenzene, methyl tertiary butyl ether (MTBE), cumene (isopropylbenzene), naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.

Refinery personnel and subcontractors recovered the spilled liquid using a vacuum truck within hours of the release. The soil impacts related to the 2019 naphtha release were visibly determined at the time of the release and verified during March 2019 remedial investigation sampling to be limited in extent. An important aspect of the conceptual understanding of the Site is the presence of known pre-existing environmental conditions as noted in the GHD Remedial Investigation Report AOI 7 (November 2017) and as further substantiated by the results for remedial investigation and post excavation samples collected and analyzed as part of investigating and remediating the 2019 naphtha release (see Section 4.2 and 4.3). The pattern and distribution of residual petroleum impacts to soil described in Section 4.2 are beyond the naphtha release area impacts and attributed to historic operations/releases, and not the naphtha release addressed in this report. Soil and groundwater conditions outside of the naphtha discharge area are being addressed by Evergreen.

The post excavation soil sample results, which indicate that soil concentrations are less than the SWHS MSCs at the limits of the remedial excavation, document the effectiveness of the cleanup actions. The depths of the excavation were based on visual impacts observed and the depth to water. The post-excavation sample depths ranged between 2 ft bgs to 4.5 ft bgs.

Residual concentrations of benzene (in four samples) and toluene (in one sample) that are present at concentrations above the non-residential SWHS in soils outside the area of visible impacts from the 2019 naphtha release area are consistent with pre-existing conditions that stem from other historical releases which are being managed by Evergreen under the Land Recycling Program.

6.0 ECOLOGICAL SCREENING ASSESSMENT

Langan completed an evaluation of ecological receptors in accordance with 25 Pa. Code § 250.311. As a first step, Langan determined whether potential ecological receptors are present at the Site. The PADEP defines applicable ecological receptors as:

- Individuals of threatened or endangered species as designated by the United States Fish and Wildlife Service (US FWS) under the Endangered Species Act (16 U.S.C.A. § § 1531—1544).

Langan completed a search of the Pennsylvania Natural Heritage Program (PNHP) inventory of threatened and endangered species and species of special concern. PNHP compiles records retained by three state governmental agencies, including the Pennsylvania Game Commission (PGC), the Pennsylvania Department of Conservation and Natural Resources (DCNR), and the Pennsylvania Fish and Boat Commission (PFBC). Based on the PHNP map, no PGC, PFBC or DCNR threatened or endangered species or species of special concern are mapped on or adjacent to the Site.

- Exceptional value wetlands as defined in § 105.17 (relating to wetlands).

According to the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory mapping application, wetlands are not located on the Site. The USFWS National Wetlands Inventory map is included as part of Appendix F. The nearest mapped wetland is on the larger former PES Refinery outside of the area of the 2019 naphtha release and is not potentially affected by the release.

- Habitats of concern.

The PNHP map also includes Natural Heritage Areas, which are core habitats and supporting landscapes for species of special concern. Natural Heritage Areas are not mapped on or adjacent to the Site According to the DCNR Conservation Planning Report, which is included as part of

Appendix F, supporting landscape areas were not identified on the Site. No additional conservation planning areas of interest were identified.

Copies of the USFWS national wetlands map, the PNHP map and the DCNR Conservation Planning Report are included as Appendix F.

Further ecological evaluation was not completed for the Site pursuant to Title 25, Chapter 250, Section 311(b) because the Site meets the following criteria as specified:

- The area of impacted soil is less than 2 acres.
- The Site has features such as buildings, parking lots or graveled paved areas, and unpaved roadways which would eliminate specific exposure pathways, such as soil exposures (250.311.b.3).

7.0 DEMONSTRATION OF ATTAINMENT

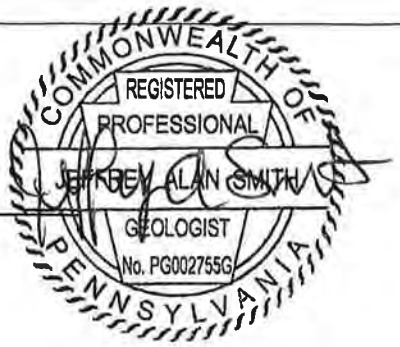
As presented in Section 4.3, and Section 5.2, the post-excavation sample results for samples collected after excavation of the 2019 naphtha release impacts, demonstrate attainment of non-residential SWHS MSCs for petroleum compounds in soils. Post-excavation soil samples were collected at locations chosen using systematic random sampling methods consistent with 25 Pennsylvania Code § 205.703. The samples are considered random and representative both horizontally and vertically of the excavated area. Excavation depths extended to just above the water table, between 2 and 6 ft bgs, and unsaturated, post-excavation soil samples were collected at depths ranging between 2 ft bgs and 4.5 ft bgs. The post-excavation soil sample analytical results not only demonstrate attainment of the non-residential SWHS but also confirm that the remediated naphtha release impacts to soils did not extend to the groundwater table.

Langan for PESRM hereby submits this Combined Remedial Investigation Report/Final Act 2 Report for Soil to the Pennsylvania Department of Environmental Protection, Southeast Regional Office, for their review and approval in demonstrating attainment of the SWHS under the Land Recycling and Environmental Remediation Standards Act. This submittal and request for approval is made under the provision of the Land Recycling and Environmental Remediation Standards Act, the Act of May 19, 1995, P.L. #4, No. 2.

8.0 PUBLIC NOTICE

The City of Philadelphia was notified of Philadelphia Energy Solutions Refining and Marketing LLC's submission of a NIR and the submission of the RI/Final Report by certified letter dated and sent June 11, 2021. The public was notified of the Final Report submission by publication of a notice in the June 3, 2021 issue of the Philadelphia Tribune newspaper. A copy of the letter sent to the city and the proof of publication are included in Appendix G, with the full NIR submission.

9.0 SIGNATURES



Jeffrey A. Smith, P.G.
Associate

Anne Garr, Assistant Secretary
Philadelphia Energy Solutions Refining and Marketing LLC

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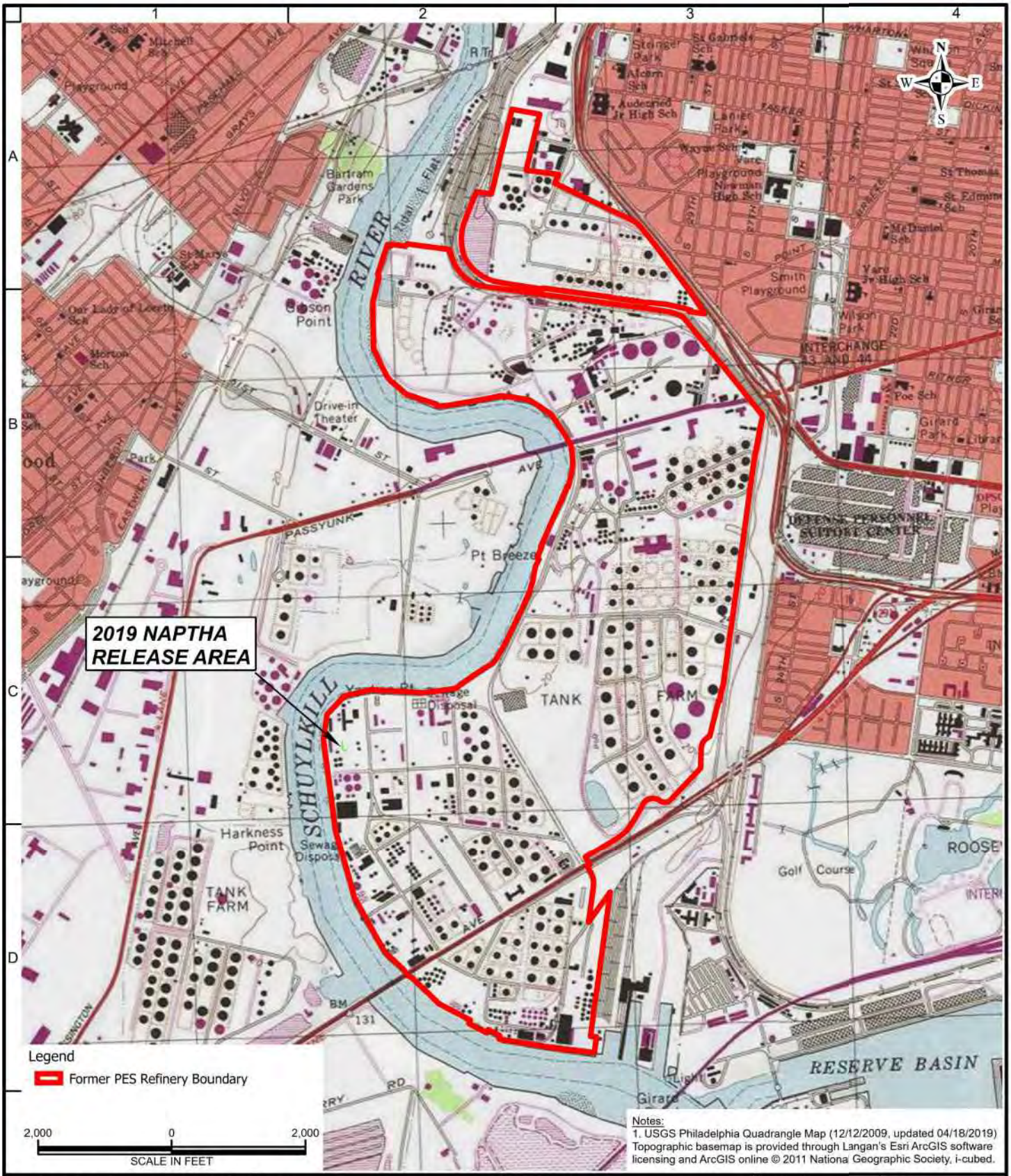
FIGURES



Notes:
1. USGS Philadelphia Quadrangle Map (12/12/2009, updated 04/18/2019) Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online © 2011 National Geographic Society, i-cubed.

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Drawing Title
2019 LIGHT NAPHTHA RELEASE AREA SITE LOCATION MAP

Project No.	220146202
Date	4/6/2021
Scale	1"=2,000'
Drawn By	KMB
Submission Date	
Figure	1

Path: \\langan.com\data\PHL\data2\220146201\Project Data\ArcGIS\APRX\PESRM Site Location Map_8-27-20.aprx Date: 4/6/2021 User: kbancone Time: 2:40 PM

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Drawing Title

2019 LIGHT NAPHTHA RELEASE AREA SITE PLAN

Project No.	220146201
Date	4/6/2021
Scale	1" = 500'
Drawn By	KMB
Submission Date	

Figure: 2

Path: \\langan.com\data\PHL\data2\220146201\Project Data\ArcGIS\APRX\PESRM_11-19-20\PESRM\PESRM.aprx Date: 4/6/2021 User: kbancone Time: 2:25 PM

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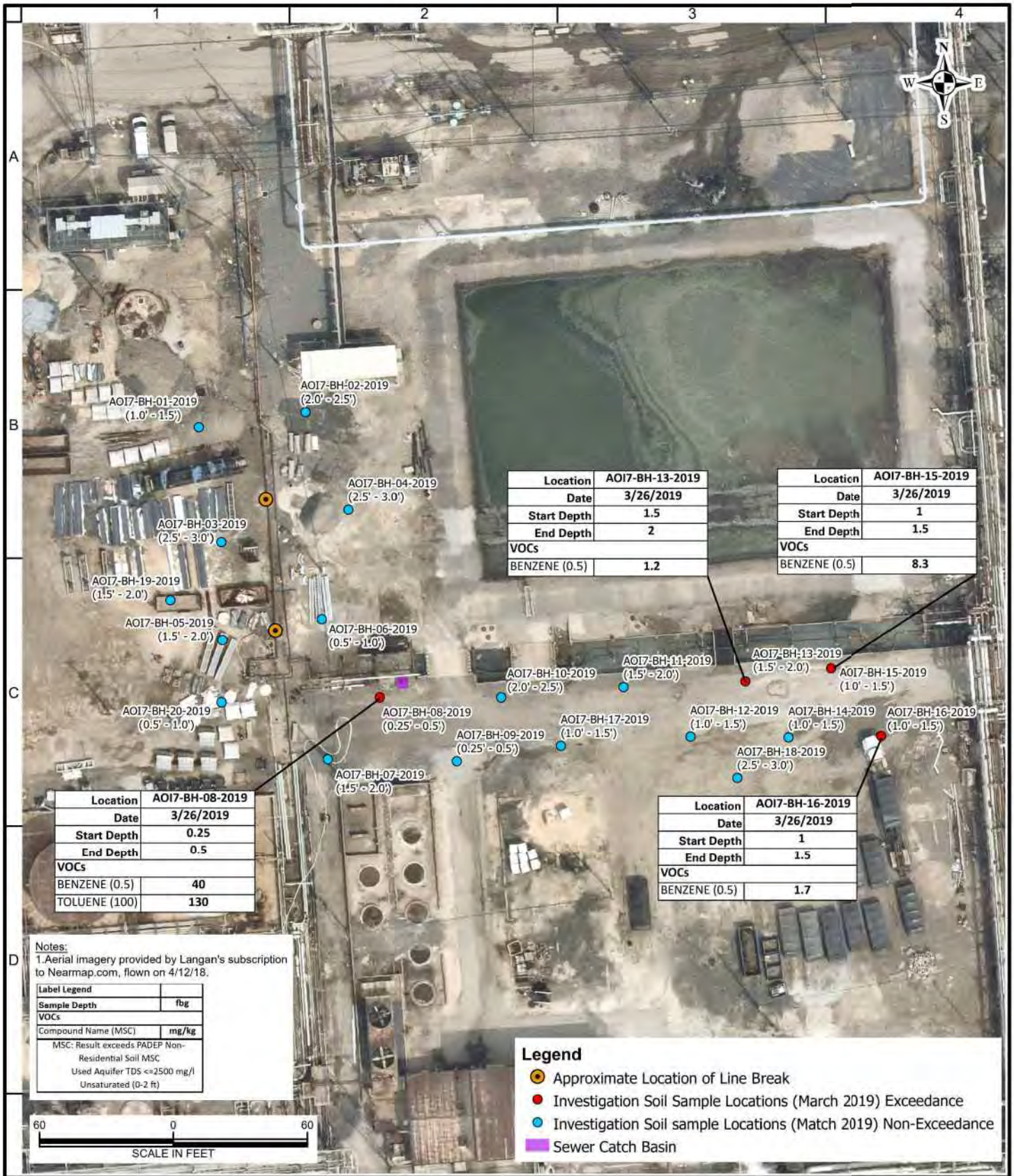
Drawing Title
2019 LIGHT NAPHTHA RELEASE AREA EXCAVATION LIMITS AND POST EXCAVATION SOIL SAMPLING LOCATION MAP

Project No.	220146201
Date	4/6/2021
Scale	1" = 40'
Drawn By	KMB
Submission Date	
Figure	3

Path: \\langan.com\data\PHL\data2\220146201\Project Data\ArcGIS\APRX\PESRM_11-19-20\PESRM\PESRM.aprx Date: 4/6/2021 User: kbancone Time: 2:23 PM



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Drawing Title
2019 LIGHT NAPTHA RELEASE AREA PRE EXCAVATION AND POST EXCAVATION SOIL EXCEEDANCE SUMMARY MAP

Project No.	220146201
Date	4/6/2021
Scale	1" = 60'
Drawn By	KMB
Submission Date	
Figure	4

Path: \\langan.com\data\PHL\data2\220146201\Project Data\ArcGIS\APRX\PESRM_11-19-20\PESRM\PESRM.aprx Date: 4/6/2021 User: kbancone Time: 2:27 PM

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Drawing Title
2019 LIGHT NAPHTHA RELEASE AREA VICINITY SOIL SAMPLE EXCEEDANCE MAP

Project No. 220146201	Figure 5
Date 4/6/2021	
Scale 1" = 150'	
Drawn By KMB	
Submission Date	

Path: \\langan.com\data\PHL\data2\220146201\Project Data\ArcGIS\APRX\PESRM_11-19-20\PESRM\PESRM.aprx Date: 4/6/2021 User: kbancone Time: 2:35 PM

TABLES

Table 4 - Release Area Spill Investigation Samples
2019 Naphtha Release Area
3144 West Passyunk Avenue, Philadelphia, PA

Analyte	CAS Number	PADEP Non-Residential Soil MSC Used Aquifer TDS <=2500 mg/l Unsaturated (0-2 ft)	PADEP Non-Residential Soil MSC Used Aquifer TDS <=2500 mg/l Unsaturated (2-15 ft)	Location	AOI7-BH-01-2019					AOI7-BH-02-2019					AOI7-BH-03-2019					AOI7-BH-04-2019					AOI7-BH-05-2019					AOI7-BH-06-2019					AOI7-BH-07-2019					AOI7-BH-08-2019					AOI7-BH-09-2019					AOI7-BH-10-2019				
				Sample ID	AOI7-BH-01-2019(1.0-1.5)_2035765					AOI7-BH-02-2019(2.0-2.5)_2035765					AOI7-BH-03-2019(2.5-3.0)_2035765					AOI7-BH-04-2019(2.5-3.0)_2035765					AOI7-BH-05-2019(1.5-2.0)_2035765					AOI7-BH-06-2019(0.5-1.0)_2035765					AOI7-BH-07-2019(1.5-2.0)_2035765					AOI7-BH-08-2019(0.25-0.5)_2035765					AOI7-BH-09-2019(0.25-0.5)_2035765					AOI7-BH-10-2019(2.0-2.5)_2035765				
				Date	3/26/2019					3/26/2019					3/22/2019					3/22/2019					3/22/2019					3/26/2019					3/26/2019					3/26/2019					3/26/2019					3/26/2019				
				Lab Sample ID	1019348					1019347					1019346					1019344					1019345					1019358					1019352					1019349					1019356					1019355				
				Start Depth	1					2					2.5					2.5					1.5					0.25					1.5					0.25					0.25					2				
				End Depth	1.5					2.5					3					3					2					1					2					0.5					0.5					2.5				
				Task Code	2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation				
				Unit	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF
CALC																																																							
MOISTURE, PERCENT	MOIST	NS	NS	mg/kg	11.8		0.5	0.5	1	17.8		0.5	0.5	1	13.2		0.5	0.5	1	21.4		0.5	0.5	1	18.8		0.5	0.5	1	11.8		0.5	0.5	1	8.6		0.5	0.5	1	21.6		0.5	0.5	1	12.6		0.5	0.5	1	15.1		0.5	0.5	1
SW8260B - VOCs																																																						
1,2,4-TRIMETHYLBENZENE	95-63-6	35	35	mg/kg	0.001	J	0.0009	0.0006	1.39	0.11	J	0.034	0.0006	47.08	ND	U	0.0007	0.0006	1	0.042	J	0.032	0.0006	42.52	0.17	J	0.034	0.0006	45.62	ND	U	0.0008	0.0006	1.21	ND	U	0.0005	0.0006	0.76	26		0.053	0.0006	69.54	ND	U	0.0006	0.0006	0.91	ND	U	0.031	0.0006	44.4
1,3,5-TRIMETHYLBENZENE	108-67-8	210	210	mg/kg	ND	U	0.0008	0.0005	1.39	0.046	J	0.029	0.0005	47.08	ND	U	0.0006	0.0005	1	ND	U	0.027	0.0005	42.52	0.048	J	0.028	0.0005	45.62	ND	U	0.0007	0.0005	1.21	ND	U	0.0004	0.0005	0.76	9.8		0.044	0.0005	69.54	ND	U	0.0005	0.0005	0.91	0.033	J	0.026	0.0005	44.4
BENZENE	71-43-2	0.5	0.5	mg/kg	0.003	J	0.0006	0.0004	1.39	0.05	J	0.023	0.0004	47.08	ND	U	0.0005	0.0004	1	0.44		0.022	0.0004	42.52	0.46		0.022	0.0004	45.62	0.001	J	0.0005	0.0004	1.21	ND	U	0.0003	0.0004	0.76	**40**		0.35	0.0004	695.41	0.002	J	0.0004	0.0004	0.91	ND	U	0.021	0.0004	44.4
ETHYLBENZENE	100-41-4	70	70	mg/kg	ND	U	0.0006	0.0004	1.39	0.055	J	0.023	0.0004	47.08	ND	U	0.0005	0.0004	1	0.058	J	0.022	0.0004	42.52	0.12	J	0.022	0.0004	45.62	ND	U	0.0005	0.0004	1.21	ND	U	0.0003	0.0004	0.76	20		0.038	0.0004	69.54	ND	U	0.0004	0.0004	0.91	0.029	J	0.021	0.0004	44.4
ISOPROPYLBENZENE (CUMENE)	98-82-8	2500	2500	mg/kg	ND	U	0.0008	0.0005	1.39	0.62		0.029	0.0005	47.08	ND	U	0.0006	0.0005	1	0.062	J	0.027	0.0005	42.52	1.2		0.028	0.0005	45.62	ND	U	0.0007	0.0005	1.21	ND	U	0.0004	0.0005	0.76	41		0.44	0.0005	695.41	ND	U	0.0005	0.0005	0.91	ND	U	0.026	0.0005	44.4
METHYL TERTIARY BUTYL ETHER	1634-04-4	2	2	mg/kg	ND	U	0.0008	0.0005	1.39	ND	U	0.029	0.0005	47.08	0.001	J	0.0006	0.0005	1	ND	U	0.027	0.0005	42.52	ND	U	0.028	0.0005	45.62	ND	U	0.0007	0.0005	1.21	ND	U	0.0004	0.0005	0.76	ND	U	0.044	0.0005	69.54	ND	U	0.0005	0.0005	0.91	ND	U	0.026	0.0005	44.4
NAPHTHALENE	91-20-3	25	25	mg/kg	0.001	J	0.0009	0.0006	1.39	1.9		0.034	0.0006	47.08	0.0009	J	0.0007	0.0006	1	0.16	J	0.032	0.0006	42.52	ND	U	0.034	0.0006	45.62	ND	U	0.0008	0.0006	1.21	ND	U	0.0005	0.0006	0.76	2		0.063	0.0006	69.54	ND	U	0.0006	0.0006	0.91	0.23	J	0.031	0.0006	44.4
TOLUENE	108-88-3	100	100	mg/kg	0.002	J	0.0005	0.0003	1.39	0.054	J	0.017	0.0003	47.08	ND	U	0.0003	0.0003	1	0.3		0.016	0.0003	42.52	0.25	J	0.017	0.0003	45.62	0.001	J	0.0004	0.0003	1.21	0.0003	J	0.0003	0.0003	0.76	**130**		0.27	0.0003	695.41	0.001	J	0.0003	0.0003	0.91	0.2	J	0.016	0.0003	44.4
XYLENES, TOTAL (DIMETHYLBENZENE)	1330-20-7	1000	1000	mg/kg	ND	U	0.001	0.0009	1.39	0.23	J	0.052	0.0009	47.08	ND	U	0.001	0.0009	1	0.17	J	0.049	0.0009	42.52	0.76	J	0.051	0.0009	45.62	ND	U	0.001	0.0009	1.21	ND	U	0.0008	0.0009	0.76	140		0.8	0.0009	695.41	ND	U	0.0009	0.0009	0.91	0.048	J	0.047	0.0009	44.4

Analyte	CAS Number	PADEP Non-Residential Soil MSC Used Aquifer TDS <=2500 mg/l Unsaturated (0-2 ft)	PADEP Non-Residential Soil MSC Used Aquifer TDS <=2500 mg/l Unsaturated (2-15 ft)	Location	AOI7-BH-11-2019					AOI7-BH-12-2019					AOI7-BH-13-2019					AOI7-BH-14-2019					AOI7-BH-15-2019					AOI7-BH-16-2019					AOI7-BH-17-2019					AOI7-BH-18-2019					AOI7-BH-19-2019					AOI7-BH-20-2019				
				Sample ID	AOI7-BH-11-2019(1.5-2.0)_2035765					AOI7-BH-12-2019(1.0-2.0)_2035765					AOI7-BH-13-2019(1.5-2.0)_2035765					AOI7-BH-14-2019(1.0-1.5)_2035765					AOI7-BH-15-2019(1.0-1.5)_2035765					AOI7-BH-16-2019(1.0-1.5)_2035765					AOI7-BH-17-2019(1.0-1.5)_2035765					AOI7-BH-18-2019(2.5-3.0)_2035765					AOI7-BH-19-2019(1.5-2.0)_2035765					AOI7-BH-20-2019(0.5-1.5)_2035765				
				Date	3/26/2019					3/26/2019					3/26/2019					3/26/2019					3/26/2019					3/26/2019					3/26/2019					3/26/2019					3/26/2019					3/26/2019				
				Lab Sample ID	1019354					1019353					1019362					1019360					1019363					1019361					1019351					1019359					1019357					1019350				
				Start Depth	1.5					1					1.5					1					1					1					1					2.5					1.5					0.5				
				End Depth	2					1.5					2					1.5					1.5					1.5					3					2					1				
				Task Code	2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation				
				Unit	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF
CALC																																																						
MOISTURE, PERCENT	MOIST	NS	NS	mg/kg	21		0.5	0.5	1	8.7		0.5	0.5	1	27.8		0.5	0.5	1	20.4		0.5	0.5	1	17		0.5	0.5	1	22		0.5	0.5	1	12.5		0.5	0.5	1	23.7		0.5	0.5	1	11.4		0.5	0.5	1	11.9		0.5	0.5	1
SW8260B - VOCs																																																						
1,2,4-TRIMETHYLBENZENE	95-63-6	35	35	mg/kg	ND	U	0.03	0.0006	39.2	0.035	J	0.026	0.0006	39.31	0.18	J	0.051	0.0006	61	0.31		0.0008	0.0006	1.05	3.3		0.027	0.0006	37.43	2.7		0.034	0.0006	44.3	ND	U	0.0007	0.0006	0.99	0.002	J	0.0008	0.0006	0.97	0.025		0.0008	0.0006	1.2	0.079	J	0.028	0.0006	40.8
1,3,5-TRIMETHYLBENZENE	108-67-8	210	210	mg/kg	ND	U	0.025	0.0005	39.2	ND	U	0.022	0.0005	39.31	0.091	J	0.042	0.0005	61	0.13		0.0007	0.0005	1.05	1.2		0.023	0.0005	37.43	1.1		0.028	0.0005	44.3	ND	U	0.0006	0.0005	0.99	8E-04	J	0.0006	0.0005	0.97	0.014		0.0007	0.0005	1.2	0.045	J	0.023	0.0005	40.8
BENZENE	71-43-2	0.5	0.5	mg/kg	ND	U	0.02	0.0004	39.2	0.068	J	0.017	0.0004	39.31	**1.2**		0.034	0.0004	61	0.19	J	0.021	0.0004	42.52	**8.3**		0.018	0.0004	37.43	**1.7**		0.023	0.0004	44.3	0.011		0.0005	0.0004	0.99	0.002	J	0.0005	0.0004	0.97	0.003	J	0.0005	0.0004	1.2	0.15	J	0.019	0.0004	40.8
ETHYLBENZENE	100-41-4	70	70	mg/kg	ND	U	0.02	0.0004	39.2	ND	U	0.017	0.0004	39.31	0.13	J	0.034	0.0004	61	0.26		0.0005	0.0004	1.05	2.1		0.018	0.0004	37.43	0.93		0.023	0.0004	44.3	0.0005	J	0.0005	0.0004	0.99	8E-04	J	0.0005	0.0004	0.97	0.007		0.0005	0.0004	1.2	0.061	J	0.019	0.0004	40.8
ISOPROPYLBENZENE (CUMENE)	98-82-8	2500	2500	mg/kg	ND	U	0.025	0.0005	39.2	ND	U	0.022	0.0005	39.31	0.043	J	0.042	0.0005	61	0.068		0.0007	0.0005	1.05	0.47		0.023	0.0005	37.43	0.76		0.028	0.0005	44.3	ND	U	0.0006	0.0005	0.99	ND	U	0.0006	0.0005	0.97	0.036		0.0007	0.0005	1.2	ND	U	0.023	0.0005	40.8
METHYL TERTIARY BUTYL ETHER	1634-04-4	2	2	mg/kg	ND	U	0.025	0.0005	39.2	ND	U	0.022	0.0005	39.31	ND	U	0.042	0.0005	61	ND	U	0.0007	0.0005	1.05	ND	U	0.023	0.0005	37.43	ND	U	0.028	0.0005	44.3	ND	U	0.0006	0.0005	0.99	ND	U	0.0006	0.0005	0.97	ND	U	0.0007	0.0005	1.2	ND	U	0.023	0.0005	40.8
NAPHTHALENE	91-20-3	25	25	mg/kg	0.078	J	0.03	0.0006	39.2	0.16	J	0.026	0.0006	39.31	0.1	J	0.051	0.0006	61	0.007	J	0.0008	0.0006	1.05	0.16	J	0.027	0.0006	37.43	0.25	J	0.034	0.0006	44.3	0.02		0.0007	0.0006	0.99	0.002	J	0.0008	0.0006	0.97	ND	U	0.0008	0.0006	1.2	ND	U	0.028	0.0006	40.8
TOLUENE	108-88-3	100	100	mg/kg	0.031	J	0.015	0.0003	39.2	0.024	J	0.013	0.0003	39.31	1		0.025	0.0003	61	0.2	J	0.016	0.0003	42.52	12		0.014	0.0003	37.43	4.3		0.017	0.0003	44.3	0.004	J	0.0003	0.0003	0.99	0.002	J	0.0004	0.0003	0.97	0.009		0.0004	0.0003	1.2	0.84		0.014	0.0003	40.8
XYLENES, TOTAL (DIMETHYLBENZENE)	1330-20-7	1000	1000	mg/kg	ND	U	0.045	0.0009	39.2	ND	U	0.039	0.0009	39.31	0.78		0.076	0.0009	61	0.15	J	0.048	0.0009	42.52	13		0.041	0.0009	37.43	9.1		0.051	0.0009	44.3	0.003	J	0.001	0.0009	0.99	0.004	J	0.001	0.0009	0.97	0.057		0.001	0.0009	1.2	0.68		0.042	0.0009	40.8

Notes:
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
NS - No standard
mg/kg - Milligrams per kilogram
Q - Qualifier
RL - Reporting Limit
MDL - Method Detection Limit
- Not analyzed for
ND - Not detected

Qualifiers:
U – The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL
UJ – The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the
J – The analyte was positively identified and the associated numerical value is the approximate concentration
E - Concentration exceeds highest calibration standard
R – The sample results are unusable due to the quality of the data generated because certain criteria were not
H - Sample is out of hold time.
B - Analyte detected in blank

Exceedance Summary:
1 - Result exceeds PADEP Non-Residential Soil MSC Used Aquifer TDS <=2500 mg/l Unsaturated (0-2 ft)
1 - Result exceeds PADEP Non-Residential Soil MSC Used Aquifer TDS <=2500 mg/l Unsaturated (2-15 ft)
J - MDL or RL greater than the applicable standard
Data Source: Analytical database provided by Stantec

Table 5 - Post Excavation Soil Sampling
2019 Naphtha Release Area
3144 West Passyunk Avenue, Philadelphia, PA

Analyte	CAS Number	PADEP Non-Residential Soil MSC Used Aquifer TDS <=2500 mg/l Unsaturated (0-2 ft)	PADEP Non-Residential Soil MSC Used Aquifer TDS <=2500 mg/l Unsaturated (2-15 ft)	Location	AOI7-PE-01					AOI7-PE-02					AOI7-PE-03					AOI7-PE-04					AOI7-PE-05					AOI7-PE-06				
				Sample ID	AOI7-PE-01-2019(3.0)_2079333					AOI7-PE-02-2019(4.5)_2079333					AOI7-PE-03-2019(3.0)_2079333					AOI7-PE-04-2019(2.5)_2079333					AOI7-PE-05-2019(2.0)_2079333					AOI7-PE-06-2019(4.0)_2079333				
				Date	12/12/2019					12/12/2019					12/12/2019					12/12/2019					12/12/2019					12/12/2019				
				Lab Sample ID	1223120					1223121					1223122					1223123					1223124					1223125				
				Start Depth	3					4.5					3					2.5					2					4				
				End Depth	3					4.5					3					2.5					2					4				
				Task Code	2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation				
				Unit	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF
CALC																																	
MOISTURE, PERCENT	MOIST	NS	NS	mg/kg	19.2		0.5	0.5	1	31.2		0.5	0.5	1	25.3		0.5	0.5	1	20.3		0.5	0.5	1	16.3		0.5	0.5	1	18.7		0.5	0.5	1
SW8260B - VOCs																																	
1,2,4-TRIMETHYLBENZENE	95-63-6	35	35	mg/kg	0.066	J	0.041	0.0006	55.31	ND	U	0.0009	0.0006	1	0.024		0.0008	0.0006	1.03	ND	U	0.032	0.0006	42.09	ND	U	0.029	0.0006	40	0.19	J	0.045	0.0006	61.27
1,3,5-TRIMETHYLBENZENE	108-67-8	210	210	mg/kg	0.043	J	0.034	0.0005	55.31	ND	U	0.0007	0.0005	1	0.052		0.0007	0.0005	1.03	ND	U	0.026	0.0005	42.09	0.036	J	0.024	0.0005	40	0.055	J	0.038	0.0005	61.27
BENZENE	71-43-2	0.5	0.5	mg/kg	0.2	J	0.027	0.0004	55.31	ND	U	0.0006	0.0004	1	0.025		0.0005	0.0004	1.03	0.032	J	0.021	0.0004	42.09	0.085	J	0.019	0.0004	40	ND	U	0.03	0.0004	61.27
ETHYLBENZENE	100-41-4	70	70	mg/kg	0.04	J	0.027	0.0004	55.31	ND	U	0.0006	0.0004	1	0.004	J	0.0005	0.0004	1.03	0.028	J	0.021	0.0004	42.09	ND	U	0.019	0.0004	40	0.064	J	0.03	0.0004	61.27
ISOPROPYLBENZENE (CUMENE)	98-82-8	2500	2500	mg/kg	0.06	J	0.034	0.0005	55.31	0.0009	J	0.0007	0.0005	1	0.003	J	0.0007	0.0005	1.03	0.63		0.026	0.0005	42.09	0.034	J	0.024	0.0005	40	0.055	J	0.038	0.0005	61.27
METHYL TERTIARY BUTYL ETHER	1634-04-4	2	2	mg/kg	ND	U	0.034	0.0005	55.31	0.001	J	0.0007	0.0005	1	ND	U	0.0007	0.0005	1.03	ND	U	0.026	0.0005	42.09	ND	U	0.024	0.0005	40	ND	U	0.038	0.0005	61.27
NAPHTHALENE	91-20-3	25	25	mg/kg	0.073	J	0.041	0.0006	55.31	ND	U	0.0009	0.0006	1	0.007	J	0.0008	0.0006	1.03	ND	U	0.032	0.0006	42.09	ND	U	0.029	0.0006	40	0.57		0.045	0.0006	61.27
TOLUENE	108-88-3	100	100	mg/kg	0.19	J	0.021	0.0003	55.31	ND	U	0.0004	0.0003	1	0.027		0.0004	0.0003	1.03	0.033	J	0.016	0.0003	42.09	0.088	J	0.014	0.0003	40	0.077	J	0.023	0.0003	61.27
XYLENES, TOTAL (DIMETHYLBENZENE)	1330-20-7	1000	1000	mg/kg	0.28	J	0.089	0.001	55.31	ND	U	0.002	0.001	1	0.076		0.002	0.001	1.03	0.097	J	0.069	0.001	42.09	0.14	J	0.062	0.001	40	0.27	J	0.098	0.001	61.27

Analyte	CAS Number	PADEP Non-Residential Soil MSC Used Aquifer TDS <=2500 mg/l Unsaturated (0-2 ft)	PADEP Non-Residential Soil MSC Used Aquifer TDS <=2500 mg/l Unsaturated (2-15 ft)	Location	AOI7-PE-07					AOI7-PE-08					AOI7-PE-09					AOI7-PE-10					AOI7-PE-11					AOI7-PE-12				
				Sample ID	AOI7-PE-07-2019(2.5)_2079333					AOI7-PE-08-2019(4.0)_2079333					AOI7-PE-09-2019(2.5)_2079333					AOI7-PE-10-2019(2.5)_2079333					AOI7-PE-11-2019(4.0)_2079333					AOI7-PE-12-2019(3.5)_2079333				
				Date	12/12/2019					12/12/2019					12/12/2019					12/12/2019					12/12/2019					12/12/2019				
				Lab Sample ID	1223126					1223127					1223128					1223129					1223130					1223131				
				Start Depth	2.5					4					2.5					2.5					4					3.5				
				End Depth	2.5					4					2.5					2.5					4					3.5				
				Task Code	2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation				
				Unit	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF
CALC																																	
MOISTURE, PERCENT	MOIST	NS	NS	mg/kg	17.6		0.5	0.5	1	19.4		0.5	0.5	1	19.7		0.5	0.5	1	19.2		0.5	0.5	1	21.4		0.5	0.5	1	20.7		0.5	0.5	1
SW8260B - VOCs																																	
1,2,4-TRIMETHYLBENZENE	95-63-6	35	35	mg/kg	0.013		7E-04	0.0006	0.95	0.002	J	0.0007	0.0006	1	0.002	J	0.0006	0.0006	0.87	ND	U	7E-04	0.0006	0.99	0.17		8E-04	0.0006	1.04	ND	U	0.031	0.0006	40.52
1,3,5-TRIMETHYLBENZENE	108-67-8	210	210	mg/kg	0.006	J	6E-04	0.0005	0.95	ND	U	0.0006	0.0005	1	8E-04	J	0.0005	0.0005	0.87	ND	U	6E-04	0.0005	0.99	0.14		7E-04	0.0005	1.04	ND	U	0.026	0.0005	40.52
BENZENE	71-43-2	0.5	0.5	mg/kg	0.024		5E-04	0.0004	0.95	0.001	J	0.0005	0.0004	1	0.006		0.0004	0.0004	0.87	ND	U	5E-04	0.0004	0.99	0.017		5E-04	0.0004	1.04	ND	U	0.02	0.0004	40.52
ETHYLBENZENE	100-41-4	70	70	mg/kg	0.005	J	5E-04	0.0004	0.95	0.0008	J	0.0005	0.0004	1	7E-04	J	0.0004	0.0004	0.87	ND	U	5E-04	0.0004	0.99	0.004	J	5E-04	0.0004	1.04	ND	U	0.02	0.0004	40.52
ISOPROPYLBENZENE (CUMENE)	98-82-8	2500	2500	mg/kg	0.002	J	6E-04	0.0005	0.95	0.001	J	0.0006	0.0005	1	ND	U	0.0005	0.0005	0.87	ND	U	6E-04	0.0005	0.99	0.19		7E-04	0.0005	1.04	0.36		0.026	0.0005	40.52
METHYL TERTIARY BUTYL ETHER	1634-04-4	2	2	mg/kg	ND	U	6E-04	0.0005	0.95	ND	U	0.0006	0.0005	1	ND	U	0.0005	0.0005	0.87	8E-04	J	6E-04	0.0005	0.99	ND	U	7E-04	0.0005	1.04	ND	U	0.026	0.0005	40.52
NAPHTHALENE	91-20-3	25	25	mg/kg	0.007		7E-04	0.0006	0.95	0.002	J	0.0007	0.0006	1	0.003	J	0.0006	0.0006	0.87	8E-04	J	7E-04	0.0006	0.99	0.004	J	8E-04	0.0006	1.04	ND	U	0.031	0.0006	40.52
TOLUENE	108-88-3	100	100	mg/kg	0.035		3E-04	0.0003	0.95	0.001	J	0.0004	0.0003	1	0.008		0.0003	0.0003	0.87	ND	U	4E-04	0.0003	0.99	0.032		4E-04	0.0003	1.04	0.022	J	0.015	0.0003	40.52
XYLENES, TOTAL (DIMETHYLBENZENE)	1330-20-7	1000	1000	mg/kg	0.036		0.001	0.001	0.95	0.003	J	0.002	0.001	1	0.004	J	0.001	0.001	0.87	ND	U	0.002	0.001	0.99	0.042		0.002	0.001	1.04	ND	U	0.066	0.001	40.52

Notes:
PADEP - Pennsylvania Department of Environmental Protection
TDS - Total Dissolved Solids
NS - No standard
mg/kg - Milligrams per kilogram
Q - Qualifier
RL - Reporting Limit
MDL - Method Detection Limit
- Not analyzed for
ND - Not detected

Qualifiers:
U – The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.
UJ – The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.
J – The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
E - Concentration exceeds highest calibration standard
R – The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
H - Sample is out of hold time.
B - Analyte detected in blank

Exceedance Summary:
1 - Result exceeds PADEP Non-Residential Soil MSC Used Aquifer TDS <=2500 mg/l Unsaturated (0-2 ft)
1 - Result exceeds PADEP Non-Residential Soil MSC Used Aquifer TDS <=2500 mg/l Unsaturated (2-15 ft)
1 - MDL or RL greater than the applicable standard
Data Source: Analytical database provided by Stantec

Table 6 - Vapor Intrusion Post-excavation Soil Screening

2019 Naphtha Release Area

3144 West Passyunk Avenue, Philadelphia, PA

Analyte	CAS Number	PADEP Act 2 Non-Residential Soil Statewide Health Standard Vapor Intrusion Screening Values	Location	AOI7-PE-01					AOI7-PE-02					AOI7-PE-03					AOI7-PE-04					AOI7-PE-05					AOI7-PE-06					AOI7-PE-07				
			Sample ID	AOI7-PE-01-2019(3.0)_2079333					AOI7-PE-02-2019(4.5)_2079333					AOI7-PE-03-2019(3.0)_2079333					AOI7-PE-04-2019(2.5)_2079333					AOI7-PE-05-2019(2.0)_2079333					AOI7-PE-06-2019(4.0)_2079333					AOI7-PE-07-2019(2.5)_2079333				
			Date	12/12/2019					12/12/2019					12/12/2019					12/12/2019					12/12/2019					12/12/2019					12/12/2019				
			Lab Sample ID	1223120					1223121					1223122					1223123					1223124					1223125					1223126				
			Start Depth	3					4.5					3					2.5					2					4					2.5				
			Task Code	2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation				
			Unit	Result	Q	RL	MDL	DF	Result	Q	RL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF
CALC																																						
MOISTURE, PERCENT	MOIST	NS	percent	19.2		0.5	0.5	1	31.2		0.5	1	25.3		0.5	0.5	1	20.3		0.5	0.5	1	16.3		0.5	0.5	1	18.7		0.5	0.5	1	17.6		0.5	0.5	1
SW8260B - VOCs																																						
1,2,4-TRIMETHYLBENZENE	95-63-6	35	mg/kg	0.066	J	0.04	0	55.31	ND	U	0.0009	1	0.024		0.0008	0.0006	1	ND	U	0.032	0.0006	42.09	ND	U	0.029	0.0006	40	0.19	J	0.045	0.0006	61.27	0.013		0.0007	0.0006	0.95
1,3,5-TRIMETHYLBENZENE	108-67-8	210	mg/kg	0.043	J	0.03	0	55.31	ND	U	0.0007	1	0.052		0.0007	0.0005	1	ND	U	0.026	0.0005	42.09	0.036	J	0.024	0.0005	40	0.055	J	0.038	0.0005	61.27	0.006	J	0.0006	0.0005	0.95
BENZENE	71-43-2	0.13	mg/kg	**0.2**	J	0.03	0	55.31	ND	U	0.0006	1	0.025		0.0005	0.0004	1	0.032	J	0.021	0.0004	42.09	0.085	J	0.019	0.0004	40	ND	U	0.03	0.0004	61.27	0.024		0.0005	0.0004	0.95
ETHYLBENZENE	100-41-4	46	mg/kg	0.04	J	0.03	0	55.31	ND	U	0.0006	1	0.004	J	0.0005	0.0004	1	0.028	J	0.021	0.0004	42.09	ND	U	0.019	0.0004	40	0.064	J	0.03	0.0004	61.27	0.005	J	0.0005	0.0004	0.95
ISOPROPYLBENZENE (CUMENE)	98-82-8	2500	mg/kg	0.06	J	0.03	0	55.31	0.0009	J	0.0007	1	0.003	J	0.0007	0.0005	1	0.63		0.026	0.0005	42.09	0.034	J	0.024	0.0005	40	0.055	J	0.038	0.0005	61.27	0.002	J	0.0006	0.0005	0.95
METHYL TERTIARY BUTYL ETHER	1634-04-4	1.4	mg/kg	ND	U	0.03	0	55.31	0.001	J	0.0007	1	ND	U	0.0007	0.0005	1	ND	U	0.026	0.0005	42.09	ND	U	0.024	0.0005	40	ND	U	0.038	0.0005	61.27	ND	U	0.0006	0.0005	0.95
NAPHTHALENE	91-20-3	25	mg/kg	0.073	J	0.04	0	55.31	ND	U	0.0009	1	0.007	J	0.0008	0.0006	1	ND	U	0.032	0.0006	42.09	ND	U	0.029	0.0006	40	0.57		0.045	0.0006	61.27	0.007		0.0007	0.0006	0.95
TOLUENE	108-88-3	44	mg/kg	0.19	J	0.02	0	55.31	ND	U	0.0004	1	0.027		0.0004	0.0003	1	0.033	J	0.016	0.0003	42.09	0.088	J	0.014	0.0003	40	0.077	J	0.023	0.0003	61.27	0.035		0.0003	0.0003	0.95
XYLENES, TOTAL (DIMETHYLBENZENE)	1330-20-7	990	mg/kg	0.28	J	0.09	0	55.31	ND	U	0.002	1	0.076		0.002	0.001	1	0.097	J	0.069	0.001	42.09	0.14	J	0.062	0.001	40	0.27	J	0.098	0.001	61.27	0.036		0.001	0.001	0.95

Analyte	CAS Number	PADEP Act 2 Non-Residential Soil Statewide Health Standard Vapor Intrusion Screening Values	Location	AOI7-PE-08					AOI7-PE-09					AOI7-PE-10					AOI7-PE-11					AOI7-PE-12				
			Sample ID	AOI7-PE-08-2019(4.0)_2079333					AOI7-PE-09-2019(2.5)_2079333					AOI7-PE-10-2019(2.5)_2079333					AOI7-PE-11-2019(4.0)_2079333					AOI7-PE-12-2019(3.5)_2079333				
			Date	12/12/2019					12/12/2019					12/12/2019					12/12/2019					12/12/2019				
			Lab Sample ID	1223127					1223128					1223129					1223130					1223131				
			Start Depth	4					2.5					2.5					4					3.5				
			Task Code	2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation					2019 PES 136 Spill Investigation				
			Unit	Result	Q	RL	MDL	DF	Result	Q	RL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF	Result	Q	RL	MDL	DF
CALC																																						
MOISTURE, PERCENT	MOIST	NS	percent	19.4		0.5	0.5	1	19.7		0.5	0.5	1	19.2		0.5	0.5	1	21.4		0.5	0.5	1	20.7		0.5	0.5	1
SW8260B - VOCs																																						
1,2,4-TRIMETHYLBENZENE	95-63-6	35	mg/kg	0.002	J	0.0007	0.0006	1	0.002	J	6E-04	0.0006	0.87	ND	U	7E-04	0.0006	0.99	0.17		8E-04	0.0006	1.04	ND	U	0.031	0.0006	40.52
1,3,5-TRIMETHYLBENZENE	108-67-8	210	mg/kg	ND	U	0.0006	0.0005	1	8E-04	J	5E-04	0.0005	0.87	ND	U	6E-04	0.0005	0.99	0.14		7E-04	0.0005	1.04	ND	U	0.026	0.0005	40.52
BENZENE	71-43-2	0.13	mg/kg	ND	U	0.0005	0.0004	1	0.001	J	4E-04	0.0004	0.87	ND	U	5E-04	0.0004	0.99	0.017		5E-04	0.0004	1.04	ND	U	0.02	0.0004	40.52
ETHYLBENZENE	100-41-4	46	mg/kg	8E-04	J	0.0005	0.0004	1	7E-04	J	4E-04	0.0004	0.87	ND	U	5E-04	0.0004	0.99	0.004	J	5E-04	0.0004	1.04	ND	U	0.02	0.0004	40.52
ISOPROPYLBENZENE (CUMENE)	98-82-8	2500	mg/kg	0.001	J	0.0006	0.0005	1	ND	U	5E-04	0.0005	0.87	ND	U	6E-04	0.0005	0.99	0.19		7E-04	0.0005	1.04	0.36		0.026	0.0005	40.52
METHYL TERTIARY BUTYL ETHER	1634-04-4	1.4	mg/kg	ND	U	0.0006	0.0005	1	ND	U	5E-04	0.0005	0.87	8E-04	J	6E-04	0.0005	0.99	ND	U	7E-04	0.0005	1.04	ND	U	0.026	0.0005	40.52
NAPHTHALENE	91-20-3	25	mg/kg	0.002	J	0.0007	0.0006	1	0.003	J	6E-04	0.0006	0.87	8E-04	J	7E-04	0.0006	0.99	0.004	J	8E-04	0.0006	1.04	ND	U	0.031	0.0006	40.52
TOLUENE	108-88-3	44	mg/kg	0.001	J	0.0004	0.0003	1	0.008		3E-04	0.0003	0.87	ND	U	4E-04	0.0003	0.99	0.032		4E-04	0.0003	1.04	0.022	J	0.015	0.0003	40.52
XYLENES, TOTAL (DIMETHYLBENZENE)	1330-20-7	990	mg/kg	0.003	J	0.002	0.001	1	0.004	J	0.001	0.001	0.87	ND	U	0.002	0.001	0.99	0.042		0.002	0.001	1.04	ND	U	0.066	0.001	40.52

Notes:

PADEP - Pennsylvania Department of Environmental Protection
NS - No standard
mg/kg - Milligram per kilogram
Q - Qualifier
RL - Reporting Limit
MDL - Method Detection Limit
- Not analyzed for
ND - Not detected

Qualifiers:

U – The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.
UJ – The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.
J – The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
E - Concentration exceeds highest calibration standard
R – The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
H - Sample is out of hold time.
B - Analyte detected in blank

Exceedance Summary:

1 - Result exceeds PADEP Act 2 Non-Residential Soil Statewide Health Standard Vapor Intrusion Screening Values
1 - MDL or RL greater than the applicable standard

Data Source: Analytical database provided by Stantec.

APPENDIX A
Previous Reporting

AGENCY NOTIFICATION FORM

☐ Discharge to Water ☒ Discharge to Land ☐ Discharge to Air

Involved Parties

(A) Reporting Party		(B) Suspected Responsible Party	
Name (Person)	Jim DiSario	Name	
Title		Phone #	PES
Phone #		Facility	
Company	Philadelphia Energy Solutions Refining and Marketing LLC	Company	PES
Type	Private		
Address	3144 West Passyunk Ave		
City	Philadelphia		
State	PA		
Zip	19145		
Were materials discharged?	☑ Yes ☐ No	Meeting Federal Obligation to Report	☑ Yes ☐ No
Calling for Responsible Party?	☑ Yes ☐ No		

Incident Description

Date: 2-22-19 Time: 9:56

Cause: Ruptured Pipe

Location and Source of Incident:
136 Lot

Incident address/location:

Nearest city: Philadelphia

Distance from the city: 0 miles

Weather at the scene:
Wind Speed: _____ Wind Direction: _____
Temperature: _____
Sky Conditions (cloudy, raining, etc.):

Waterway Impact:
☐ Delaware River
☐ Schuylkill River
☐ Wetlands

Latitude degrees: 39° 55′ 11″
Longitude degrees: 75° 11′ 49″

Storage Tank Container Type
☐ AST ☐ UST ☐ Drum ☐ Vessel ☐ Unknown

Container/Tank capacity:

Facility capacity:

Materials

Type: (e.g. diesel, gasoline) Lt. Naptha

Discharged Qty: 5B/298gal Unit of measure: ☑ gallons ☐ bbls In Water (Qty):

Response Action

Action taken to correct or mitigate incident:
*Took Line out of Service
*Used Vac Trucks to suck up Product.

nber of injuries:		Number of fatalities:	
ere there evacuations?	☐ Yes ☒ No ☐ Unknown	Number evacuated:	
Was there damage?	☐ Yes ☐ No ☒ Unknown	Damage in $:	

Additional Information (not recorded elsewhere in this report)

CALLER NOTIFICATION

It is not necessary to wait for all information before calling the
National Response Center: 1-800-424-8802

Agency Notified	Phone Number	Date	Time	Person Notified	Incident #
NRC	800-424-8802				
Coast Guard	215-271-4800				
PEMA	800-424-7362 or 717-651-2001				
PADEP	484-250-5970 or 484-250-5900	2-25-19	9 AM	ANDREW SINCLAIR	— MESSAGE
PAFBC	717-626-0228				
LEPC	215-686-1141 or 311				
AMS	215-685-7580 215-686-4516 (night/weekend)				

FOLLOW-UP NOTIFICATION Date: 2-26-19 ☒ By Phone ☐ Written

Name of Reporter: Jim DiSario

Additional information reported:	UPDATED QUANTITY TO 53,298 SAC.

Investigation Report

Incident Name:	137 SR Gasoline Leak	**Tracking Number:**	First 48-2019-026	**Impact Number:**	111906
Date/Time of Incident:	2/22/19 9:56 PM	**Location of Incident:**	**137 UNIT**		
Investigation Team Leader:	Jared Lucchesi				

Section 1 – Incident Details

Incident Category

	Occupational Injury/Illness		Vehicle Accident	X	Environmental Incident
	Fire Loss		Near Miss		Product Quality
X	Reliability	X	Mechanical Integrity		Quality
	Other:				

Describe What Happened:

At 9:56 PM the 6" SR Gasoline rundown line from 137 to the North Tank field was discovered to have significant leaks. There were a total of 3 blown out portions of the line within 20 feet of eachother in the old 6 Still lot and 4 other blown out gaskets on flanges throughout the line. 137 Operations isolated the line at a manifold near the electric shop as well as within battery limits. SR gasoline continued to flow through the 6" secondary rundown line. A vac truck quickly was on scene to begin clean up of the area.

Section 2 – First 48

To be discussed 48 to 72 hours of incident with appropriate Manager and Investigation Leader

List Facts from Incident:

- WWTP operator contacted WWTP Shift Supervisor after observing leak.
- WWTP Shift Supervisor contacted 137 Shift Supervisor to report leak. FSS notified and Vac Truck sent to leaking area.
- 137 Operations walked down line to identify isolation points to NTF.
- While walking down the isolation points, 137 Operations found 3 blown out areas of the line at the old 6 Still lot as well as 4 leaking flanges at different points throughout the line.
- 137 Shift Supervisor showed B&S Supervisor isolation points. B&S to Lockout and put Do Not Operate Tags on valves.
- Quantity of material remains to be estimated

Are there any contributing factors to Incident?
If Yes, Describe below.

- Stagnet and wet SR Gasoline may have frozen during cold weather causing splits in line.

Systems that prevented escalation of incident:

- Good Operator rounds at WWTP
- Good communication and quick action to isolate the leak
- Vac truck to immediately begin cleaning up spilled material

Describe any immediate actions taken to mitigate risk:

- Isolation of the leaking line.
- Vac truck to clean up leaks to grade.
- Locked out isolation valves
- Do Not Operate Tags placed on valves

If the incident being reviewed needs further investigation, continue to complete Sections 3, 4 and 5 below.

Otherwise, continue to Section 5.

Section 3
Incident Investigations and Serious Incident Investigations (II/SII)

Investigations requiring meeting for review of Root Causes and Corrective and Preventative Actions

Investigation Team Members	

Product Loss (Environmental/Process Safety Incidents)

Product/Stream Involved		**Product Status**	❑ Product Lost ❑ Product Contaminated ❑ Product Downgraded	**Volume Measurement**	❑ Barrels ❑ Pounds ❑ Gallons
Volume Released/Contaminated		**Volume Recovered**		**Volume Lost**	
LPO (in $)		**Repair Cost (in $)**			

Describe Information Learned from Investigation:

Immediate Cause

Description	

Root Cause(s)

Description	1.
Description	2.
Description	3.
Description	4.

Section 4 - Corrective and Preventive Actions

Description:	Write a Lessons Learned flash detailing the Investigation, Lessons Learned, and Corrective and Preventive Actions written by the Investigation Team (due 30 days once the investigation has been fully approved)		
Responsible Person:			
Estimated Completion Date:		**Actual Completion Date:**	

Description:			
Responsible Person:			
Estimated Completion Date:		**Actual Completion Date:**	

Description:			
Responsible Person:			
Estimated Completion Date:		**Actual Completion Date:**	

Description:			
Responsible Person:			
Estimated Completion Date:		**Actual Completion Date:**	

Description:			
Responsible Person:			
Estimated Completion Date:		**Actual Completion Date:**	

Description:			
Responsible Person:			
Estimated Completion Date:		**Actual Completion Date:**	

Description:			
Responsible Person:			
Estimated Completion Date:		**Actual Completion Date:**	

Description:			
Responsible Person:			
Estimated Completion Date:		**Actual Completion Date:**	

Description:			
Responsible Person:			
Estimated Completion Date:		**Actual Completion Date:**	

Section 5 – Approvals of Investigation

Position	Name	Signature	Date
VP/ General Manager (SII)			
Operations Director (SII)			
Executive Maintenance Director (SII)			
Technical Services Director (SII, II)			
Director HSSE (SII,II)			
Legal Department (SII)			
Area Manager (II)			
Manager Field Execution (II)			
TOP Coordinator (TOP Incidents)			

Note: Depending on topic of investigation, additional approvals may be necessary.

Stantec Consulting Services Inc.
1060 Andrew Drive, Suite 140 West Chester, PA 19380

November 13, 2020
File: 213403246

Attention: Tiffani L. Doerr, P.G.
Evergreen Resources Management Operations
2 Righter Parkway, Suite 120
Wilmington, DE 19803

Dear Tiffani,

Reference: Unit 137 Line Release in the Area of Former 136 Unit: Investigation Summary

Stantec Consulting Services Inc. (Stantec) has prepared this report for Evergreen Resources Management Operations (Evergreen) to summarize the investigation and remedial action activities performed in Area of Interest 7 (AOI 7) following a release of light naphtha at the Philadelphia Energy Solutions Refining & Marketing LLC (PES) Philadelphia Refining Complex (Complex) in Philadelphia, Pennsylvania (**Figure 1**). In February 2019, PES had a release from a section of aboveground piping associated with 137 Crude Unit (Unit 137) in the Girard Point Refinery. The release occurred in the area of the former 136 Crude Unit (Unit 136) (**Figure 2**). During a PES investigation and remedial activities that followed this release, evidence of suspected legacy environmental impacts was observed, including subsurface light non-aqueous phase liquid (LNAPL) that appeared to be degraded and buried drums.

AOI 7 BACKGROUND

AOI 7, also known as the Girard Point Fuels Processing Area, was one of the main process areas in the Girard Point Refinery historically containing a fluid catalytic cracker (FCC) unit, carbon monoxide boiler, sulfur plant, East and West Sludge Basin - RCRA Tank, Hazardous Waste Incinerator, and crude units. Most recently under PES operation, the area housed crude units, FCC and alkylation units, flares, cooling towers and aboveground storage tanks. AOI 7 has been investigated by Evergreen and its predecessor under Act 2 of the Pennsylvania Land Recycling Program for the PES Complex. A remedial investigation report (RIR) summarizing the Evergreen investigation activities was submitted to the Pennsylvania Department of Environmental Protection (PADEP) on June 9, 2017 and approved on August 30, 2017.

Shallow subsurface material in the area consists of anthropogenic fill that was placed in the early 1900s to make usable land over historic Schuylkill River marshes and tidal creeks. A thick sequence of predominantly fine-grained, muddy river and marsh deposits underlies the fill. Groundwater flow in the shallow unconfined aquifer is generally toward the Schuylkill River to the west with some mounding particularly near the bulkheads. Groundwater may also flow vertically downward from the shallow, unconfined aquifer through the muddy river and marsh deposits (aquitard), and into the underlying lower aquifer.

PREVIOUS INVESTIGATIONS

The 2019 PES release occurred from a product line to the south of Unit 137 in the area of the former Unit 136. Representations of the historic structures are shown on **Figure 3**. Aerial imagery indicates that the historic crude unit was constructed prior to 1950 and demolished between 1999 and 2002. The foundation observed in association with LNAPL seepage in the northeastern portion of the excavation may be associated with the round and oval structures immediately to the east. The buried drums were located in the central area of the Unit 136 infrastructure. The former hazardous waste tanks and sludge basins were located to the southwest, outside of the Unit 136 area.

As a part of Evergreen's AOI 7 remedial investigation activities described in the 2017 RIR, previous soil and groundwater investigations have been conducted in areas near the impacts discovered in the Unit 137 line release investigation. Locations of previous soil samples and monitoring wells are shown on **Figure 3**. Soil samples were collected in the area around Unit 136, with efforts concentrated near the former cooling tower and Tank GP 1002. Soil sample analytical results are summarized on **Table 1** and **Table 2** which show comparisons of constituents on the Evergreen Petroleum Short List to the non-residential Statewide Health Standards (SHS) and non-residential direct contact (NRDC) medium specific concentrations (MSCs), respectively. No COCs were detected above the NRDC MSCs and only benzene, lead, and toluene were detected above the SHS. No monitoring wells are present in the immediate area where LNAPL and the drums were observed. Gauging of nearby wells has not shown any detectable in-well thickness of LNAPL except for a singular measurement at C-105 in 2011 (**Table 3**) which appears to be an outlier. The results of groundwater sampling of area wells conducted between 1995 and 2016 is summarized on **Table 4**. Comparison to the PADEP non-residential, used aquifer (total dissolved solids [TDS] less than or equal to 2,500 milligrams per liter [mg/l]) SHS shows primarily pre-2016 exceedances of semi-volatile organic compounds in well C-104 which is located to the southwest of the drum area. Total lead, which is not directly comparable to the current SHS for dissolved lead, has also been detected historically in this well. The closest downgradient well to the release area, C-61, did not have any SHS exceedances of groundwater in the two most recent sampling events.

PES RELEASE AND INTERIM REMEDIAL ACTIONS

In February 2019, PES restarted Unit 137 and when the aboveground product line was charged, light naphtha was released out of two undiscovered defects. The location of the release with respect to the PES Complex is shown on **Figure 1**, and the locations of the line breaks are shown on **Figure 2**. This release area is generally referred to as the 136 area since this is the location of the former Unit 136. An estimated 53,000 gallons of product identified as light naphtha was released to the ground surface and was observed generally to flow along surface grading in a southerly direction, parallel to the piping run. The surface flow was observed to then dogleg to the east toward a sewer catch basin. PES performed immediate interim remedial actions to mitigate potential impacts from the release which included removal of liquids from the storm sewer and culvert via vacuum truck and removal of water/product mixture from test pits advanced along the compromised product line. The damaged section of product line was replaced with new piping.

PES RELEASE REMEDIAL INVESTIGATION

Stantec performed a site visit in February 2019 to observe the possible extents of the release and the open test pits in the area of the Unit 137 line break. The site visit observations were used to form the basis of future sampling and remediation activities. In March 2019, Stantec collected 20 soil samples from 20 soil borings (AOI7-BH-01 through AOI7-BH-20) completed in the vicinity of the release. The borings were performed based upon topography and field observations to confirm the extent of the potential impact from the release. Soil borings were advanced using a decontaminated stainless-steel hand auger to the depth of water-saturated soil, which was observed to range from 0.5 to 3 feet below ground surface (ft bgs). A Stantec geologist recorded soil descriptions and screening results for total volatile organic compounds (VOCs) collected using a photoionization detector (PID). Soil samples for laboratory analysis were collected from the 0.5 ft-interval above the observed water table. The samples were analyzed for the PADEP Petroleum Short List for unleaded gasoline which consists of benzene, toluene, ethylbenzene, xylenes, methyl tertiary butyl ether (MTBE), cumene (isopropylbenzene), naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene. Soil samples were submitted to Pennsylvania-certified Eurofins Lancaster Laboratories Environmental in Lancaster, Pennsylvania for analysis of VOCs by EPA SW-846 Method 8260B. The soil boring locations are presented in **Figure 3**, the analytical results are summarized in **Table 5,** a summary of the field observations is presented in **Table 6,** and the laboratory analytical results are included as **Attachment A**.

Consistent with the work conducted for the PES Complex Act 2 remedial investigations, the soil results were compared to the MSCs for non-residential properties developed by PADEP to implement the SHS under Act 2. Benzene was detected above the SHS in four soil samples, and toluene was detected above the SHS in one soil sample. Field observations made during the soil boring activities indicated the area had evidence of historic impacts. As described on **Table 6**, dark staining and degraded hydrocarbon odors were noted in several of the soil boring locations. Therefore, PES determined the extent of remedial action to address the February 2019 release based on field observations of light naphtha impacts.

REMEDIAL ACTION

In order to remediate soils impacted by the February 2019 Unit 137 light naphtha release, PES conducted an excavation in the area between November 25 and December 12, 2019. Prior to excavation activities, a utility survey was performed by Master Locators, and a report summarizing the findings is included as **Attachment B**. Stantec and Riggs Distler provided oversight of AmQuip to excavate soils in the area depicted on **Figure 4**. Soil was removed from the area beneath and adjacent to the observed breaks in the Unit 137 light naphtha product line and a linear area to the east where product migrated to the sewer catch basin. The horizontal extent of the excavation was guided by visual observations and field measurements of total VOCs as measured using a PID. Vertically, the excavation extended to the depth of the observed water table which is tidally influenced and ranged from approximately 2.0 to 6.0 ft bgs. Approximately 400 tons of soil were removed and disposed offsite at Clean Earth of New Castle, Delaware. Disposal documentation is included in **Attachment C**.

During excavation activities, the field team observed additional historical petroleum impacts in the subsurface. Four buried drums were encountered at approximately 3 to 4 ft bgs near the central area of the excavation as shown on **Figure 4**. The drums were observed to be in a deteriorated condition, and an unknown viscous product was observed in the drums and surrounding soil. The drums and the adjacent

LNAPL-impacted soil were removed and containerized separately from the rest of the excavation soils. Free product that entered the excavation was removed via vacuum truck. Additionally, in the northeastern corner of the excavation, dark LNAPL was observed to be seeping from beneath a north-south trending concrete footer (see **Figure 4**) and locally impacting soils. Free product was recovered with a vacuum truck, and soil was excavated. These soils were containerized with the waste soil from the buried-drum area and were transported offsite April 23, 2020 to Ross Incineration Services Inc. in Grafton, Ohio. Disposal documentation is included as **Attachment D** including a certificate of destruction for the incineration of the soils on July 3, 2020. Due to the historic nature of the drums (pre-2012), Evergreen managed disposal of the drums and surrounding soils.

Post-excavation soil sampling was conducted by Stantec on behalf of PES to address the naphtha release area using systematic random sampling consistent with 25 Pennsylvania Code § 205.703(c). Twelve samples were collected from the excavation base and sidewalls as shown on **Figure 4**. The samples were analyzed for the PADEP petroleum Short List parameters for unleaded gasoline by Eurofins Lancaster Laboratories Environmental in Lancaster, Pennsylvania for analysis of VOCs by EPA SW-846 Method 8260B. The post-excavation soil sample results yielded concentrations of COCs that were either below the PADEP non-residential SHS or non-detect indicating the successful removal of impacts related to the light naphtha release. The analytical results are summarized on **Table 7**, and a copy of the laboratory analytical data report is included in **Attachment A**. Following post-excavation soil sampling, the excavation was backfilled with soil that was eligible for reuse according to the May 23, 2013 *Onsite Soil Reuse Plan*.

The results of waste characterization sampling conducted prior to disposal are included in **Attachment E**. The impacted soils managed by Evergreen were handled as hazardous waste due to elevated levels of lead detected using the toxicity characteristic leaching procedure (TCLP). It is also notable that the total lead result for the composite waste soil sample was above the site-specific standard for lead. Several VOCs and SVOCs on the Evergreen Petroleum Short List were detected in the waste characterization sample, but at concentrations below the SHS.

DISCUSSION

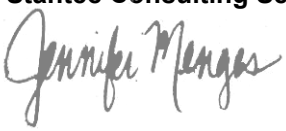
Investigation and remediation of a recent PES release revealed historic impacts consisting of subsurface LNAPL and buried product-filled drums which were removed and disposed of along with surrounding impacted soils. A review of both recent and historic soil sampling results shows some SHS exceedances for VOCs and lead, but no NRDC exceedances. Nearby groundwater sampling historic results have shown exceedances of SVOCs and detections of total lead. Shallow subsurface material in this area of the site consists of historic anthropogenic fill which is heterogenous in nature. Such fill has been noted to contain SVOCs and lead in many parts of the site that are likely related specifically to the fill makeup (e.g., smelter slag and cinders) and not to historic refinery operations beyond importing and placing the fill. Field observations made during the PES excavation showed subsurface materials to be primarily sands and gravels, and no specific characteristics that would indicate the SVOC and lead-containing fill materials were noted (i.e. ash, cinders).

Due to the deteriorated condition of the drums, weathered appearance of the impacts observed in soil, and fact that the former operational unit in this area was decommissioned approximately 30 years ago, observed petroleum impacts are likely longstanding. Evergreen currently manages the legacy Act 2

investigation and remediation program across the site. This area is included in the Act 2 Site and will be incorporated into future Act 2 activities.

Regards,

Stantec Consulting Services Inc.



Jennifer Menges
Principal, LRS
Phone: 610 840-2540
Fax: 610 840-2501
jennifer.menges@stantec.com

Attachment:
Figure 1: Site Map
Figure 2: Unit 137 Line Release in the Area of Former 136 Unit
Figure 3: Former Unit 136 Area Map
Figure 4: Soil Sample and Excavation Location Map
Table 1: Historical Soil Analytical Results Summary, Statewide Health Standards
Table 2: Historical Soil Analytical Results Summary, Direct Contact Medium-Specific Concentrations
Table 3: Select Well Gauging Data for AOI 7
Table 4: Historical Groundwater Analytical Results Summary
Table 5: Soil Analytical Data Summary
Table 6: Field Observations Summary - Soil Characterization Sampling
Table 7: Post-Excavation Soil Analytical Results Summary
Attachment A: Release Investigation and Post-Excavation Soil Sampling Laboratory Analytical Data Reports
Attachment B: Master Locators Utility Locate Report
Attachment C: PES Soil Disposal Documentation
Attachment D: Evergreen Soil Disposal Documentation
Attachment E: Waste Characterization Laboratory Analytical Data Reports

FIGURES

Legend

- UNIT 137 LINE RELEASE LOCATION
- AREA OF INTEREST (AOI) BOUNDARY

0 1,100 2,200 Feet

1:26,400 (at original document size of 8.5x11)

N

Stantec

Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Sources: Stantec, USGS
3. Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community PEMA Philadelphia County 2018 Aerial Imagery

Project Location
City of Philadelphia, Philadelphia County, Pennsylvania

213403246
Prepared by GWC on 4/6/2020
Technical Review by JKK on 4/21/2020
Independent Review by JLM on 9/18/2020

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Figure No.
1

Title
SITE MAP

Figure No.
2

Title
UNIT 137 LINE RELEASE IN THE AREA OF FORMER 136 UNIT

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia, Philadelphia County, Pennsylvania

213403246
Prepared by GWC on 4/6/2020
Technical Review by JKK on 4/21/2020
Independent Review by JLM on 9/18/2020

0 35 70 Feet
1:420 (At original document size of 11x17)

N

LEGEND

APPROXIMATE LOCATION OF LINE BREAK

SEWER CATCH BASIN

Notes
1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Service Layer Credits: Copyright © 2013 National Geographic Society, i-cubed PEMA Philadelphia County 2018 Aerial Imagery

Stantec

Figure No.
3

Title
FORMER UNIT 136 AREA MAP

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia, Philadelphia County, Pennsylvania

213403246
Prepared by GWC on 5/9/2020
Technical Review by JKK on 5/29/2020
Independent Review by JLM on 9/18/2020

0 30 60 Feet
1:720 (At original document size of 11x17)

N

LEGEND

- SHALLOW SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD 0-2'
- NO SHALLOW SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD 0-2'
- DEEP SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD GREATER THAN 2'
- NO DEEP SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD GREATER THAN 2'
- WELL LOCATION
- BURIED DRUM LOCATION
- WATER-TABLE ELEVATION CONTOUR (FEET NAVD 88)
- PROCESS SEWER (APPROXIMATE)
- SANITARY SEWER (APPROXIMATE)
- STORM WATER (APPROXIMATE)
- LNAPL-IMPACTED AREAS
- AREA OF INTEREST (AOI) BOUNDARY

Notes
1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Locations of historical structures are approximated based on operational site plans
3. Service Layer Credits: Copyright© 2013 National Geographic Society, i-cubed
   PEMA Philadelphia County 2018 Aerial Imagery

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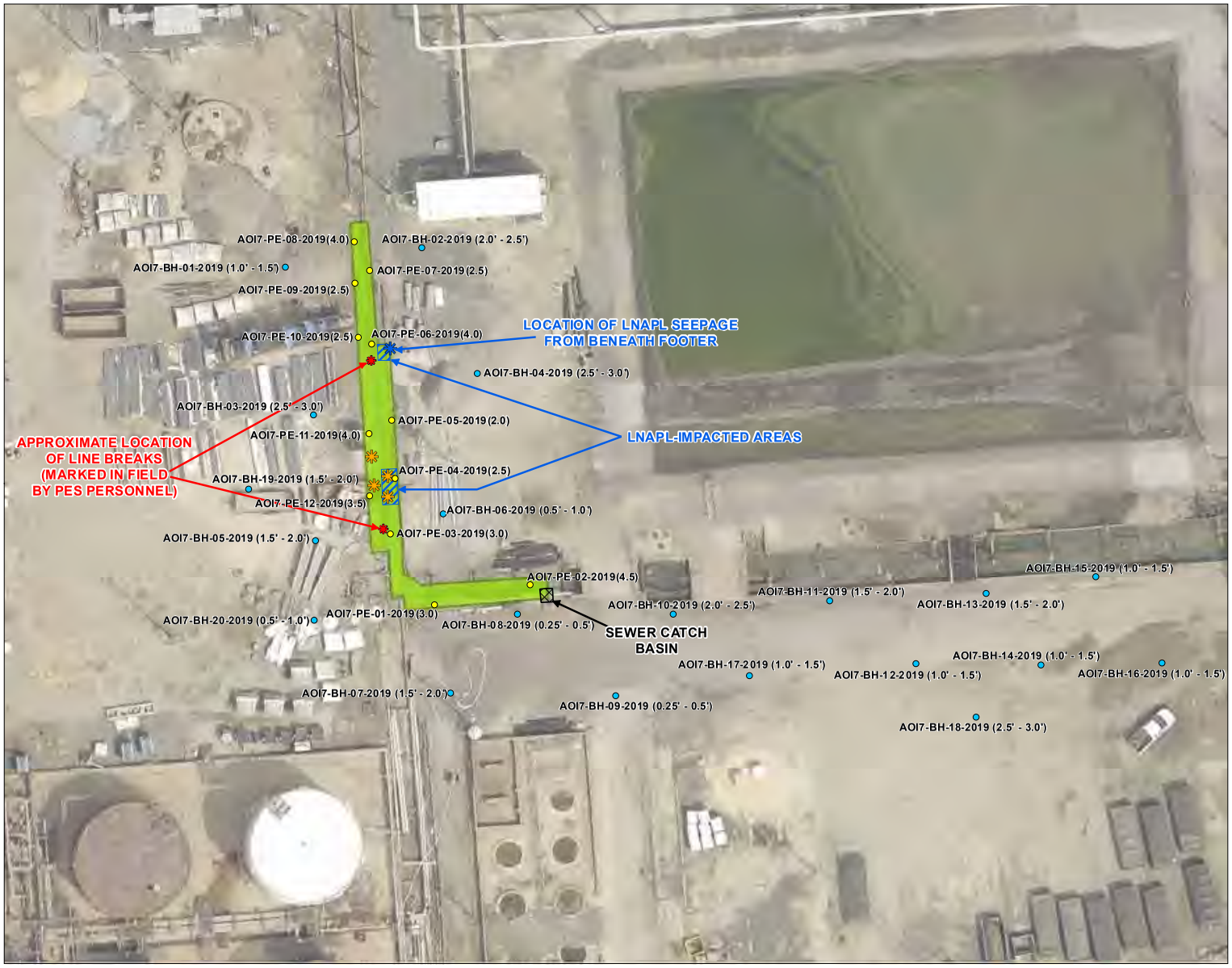

Figure No.
4

Title
SOIL SAMPLE AND EXCAVATION LOCATION MAP

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia, Philadelphia County, Pennsylvania

213403246
Prepared by GWC on 4/6/2020
Technical Review by JKK on 4/21/2020
Independent Review by JLM on 9/18/2020

0 35 70 Feet
1:420 (At original document size of 11x17)

N

LEGEND

- INVESTIGATION SOIL SAMPLE LOCATION
- POST-EXCAVATION SOIL SAMPLE LOCATION
- APPROXIMATE LOCATION OF LINE BREAK
- BURIED DRUM LOCATION
- LOCATION OF LNAPL SEEPAGE FROM BENEATH FOOTER
- SEWER CATCH BASIN
- LNAPL-IMPACTED AREAS
- EXTENT OF EXCAVATION

Notes
1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Service Layer Credits: Copyright © 2013 National Geographic Society, i-cubed
PEMA Philadelphia County 2018 Aerial Imagery

Stantec

TABLES

Table 1 - Historical Soil Analytical Results Summary
Statewide Health Standards
Unit 137 Line Release in the Area of Former Unit 136
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-45	AOI7 BH-12-46	AOI7 BH-12-47	AOI7 BH-12-48	AOI7 BH-12-49	AOI7 BH-12-53	AOI7-BH-13-45		AOI7-BH-13-46	AOI7-BI
Sample Date				29-Nov-12	29-Nov-12	29-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12	13-Mar-13	13-Mar-13	13-Mar-13	13-Mar-13
Sample ID				BH-12-45_3.5'	BH-12-46_0.5'	BH-12-47_1.5'	BH-12-48_3'	BH-12-49_2.5'	BH-12-53_2.5'	AOI7-BH-13-45_1.5-2_031313	AOI7-BH-13-45_2-2.5_031313	AOI7-BH-13-46_1.5-2_031313	AOI7-BH-13-47_1.5-2_031313
Sample Depth				3 - 3.5 ft	0 - 0.5 ft	1 - 1.5 ft	2.5 - 3 ft	2 - 2.5 ft	2 - 2.5 ft	1.5 - 2 ft	2 - 2.5 ft	1.5 - 2 ft	1.5 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		SHS-PA	SHS-PA	JB22561	JB22561	JB22561	JB22549	JB22549	JB22549	JB31265	JB31265	JB31265	JB31265
Laboratory Sample ID	Units	(0-2 ft bgs)	(2-15 ft bgs)	JB22561-11	JB22561-8	JB22561-9	JB22549-5	JB22549-6	JB22549-4	JB31265-3	JB31265-4	JB31265-7	JB31265-5
Volatile Organic Compounds													
BENZENE	mg/kg	0.5	0.5	ND (0.0013)	ND (0.00082)	ND (0.092)	ND (0.0012)	ND (0.00083)	ND (0.066)	ND (0.14)	ND (0.13)	ND (0.00086)	ND (0.12)
1,2-DIBROMOETHANE (EDB)	mg/kg	0.005	0.005	ND (0.0013)	ND (0.00082)	*ND (0.092)*	ND (0.0012)	ND (0.00083)	*ND (0.066)*	*ND (0.14)*	*ND (0.13)*	ND (0.00086)	*ND (0.12)*
1,2-DICHLOROETHANE (EDC)	mg/kg	0.5	0.5	ND (0.0013)	ND (0.00082)	ND (0.092)	ND (0.0012)	ND (0.00083)	ND (0.066)	ND (0.14)	ND (0.13)	ND (0.00086)	ND (0.12)
ETHYLBENZENE	mg/kg	70	70	ND (0.0013)	ND (0.00082)	ND (0.092)	ND (0.0012)	ND (0.00083)	0.164	ND (0.14)	ND (0.13)	ND (0.00086)	ND (0.12)
ISOPROPYLBENZENE (CUMENE)	mg/kg	2,500	2,500	ND (0.0063)	ND (0.0041)	ND (0.46)	ND (0.0062)	ND (0.0042)	ND (0.33)	ND (0.69)	ND (0.64)	ND (0.0043)	ND (0.58)
METHYL TERTIARY BUTYL ETHER	mg/kg	2	2	ND (0.0013)	ND (0.00082)	ND (0.092)	ND (0.0012)	ND (0.00083)	ND (0.066)	ND (0.14)	ND (0.13)	ND (0.00086)	ND (0.12)
NAPHTHALENE	mg/kg	25	25	ND (0.0063)	ND (0.0041)	ND (0.46)	ND (0.0062)	ND (0.0042)	0.989	-	-	-	-
TOLUENE	mg/kg	100	100	ND (0.0013)	ND (0.00082)	0.288	ND (0.0012)	ND (0.00083)	0.148	0.140	ND (0.13)	ND (0.00086)	0.252
1,2,4-TRIMETHYLBENZENE	mg/kg	35	35	ND (0.0063)	ND (0.0041)	ND (0.46)	ND (0.0062)	ND (0.0042)	1.86	ND (0.69)	ND (0.64)	ND (0.0043)	ND (0.58)
1,3,5-TRIMETHYLBENZENE	mg/kg	210	210	ND (0.0063)	ND (0.0041)	ND (0.46)	ND (0.0062)	ND (0.0042)	0.474	ND (0.69)	ND (0.64)	ND (0.0043)	ND (0.58)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	1,000	1,000	0.0021	ND (0.00082)	0.111	ND (0.0012)	ND (0.00083)	0.942	0.474	0.394	ND (0.00086)	0.255
Semi-Volatile Organic Compounds													
ANTHRACENE	mg/kg	350	350	1.04	ND (0.032)	ND (0.39)	0.820	0.0698	0.409	ND (0.21)	0.256	0.0831	0.459
BENZO(A)ANTHRACENE	mg/kg	130	430	2.16	0.139	3.38	0.800	0.260	0.914	0.482	0.550	0.335	1.23
BENZO(A)PYRENE	mg/kg	12	46	2.89	0.129	0.731	1.02	0.278	0.921	0.395	0.600	0.347	1.25
BENZO(B)FLUORANTHENE	mg/kg	76	170	2.82	0.177	ND (0.39)	0.717	0.263	0.895	0.425	0.643	0.535	1.14
BENZO(G,H,I)PERYLENE	mg/kg	180	180	1.93	0.166	ND (0.39)	1.14	0.226	0.839	0.485	0.601	0.309	0.818
BENZO(K)FLUORANTHENE	mg/kg	76	610	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	230	230	2.35	0.199	1.82	1.60	0.305	1.31	1.26	1.29	0.546	1.40
DIBENZ(A,H)ANTHRACENE	mg/kg	22	270	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	3,800	3,800	1.14	ND (0.032)	0.418	0.217	ND (0.036)	0.297	ND (0.21)	ND (0.21)	ND (0.037)	0.211
NAPHTHALENE	mg/kg	25	25	-	-	-	-	-	-	ND (0.21)	ND (0.21)	ND (0.037)	0.190
PHENANTHRENE	mg/kg	10,000	10,000	1.42	0.183	2.95	1.25	0.201	1.25	0.246	0.217	0.266	1.07
PYRENE	mg/kg	2,200	2,200	3.39	0.237	ND (0.39)	2.10	0.410	1.81	1.39	1.95	0.585	1.46
Metals													
LEAD, Total	mg/kg	450	450	***758***	121	***2,060***	***1,530***	107	***510***	***498***	***753***	237	***866***

Notes:

SHS-PA	Pennsylvania Department of Environmental Protection - Statewide Health Standards - Non-Residential, Unsaturated Soil
6.5	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
ND (0.50)	Laboratory reporting limit was greater than the applicable standard.
ND (0.03)	Analyte was not detected at a concentration greater than the laboratory reporting limit.
-	Parameter not analyzed
J	Indicates an estimated value
ft bgs	Feet below ground surface
mg/kg	Milligrams per kilogram
LL	Eurofins Lancaster Laboratories Environmental